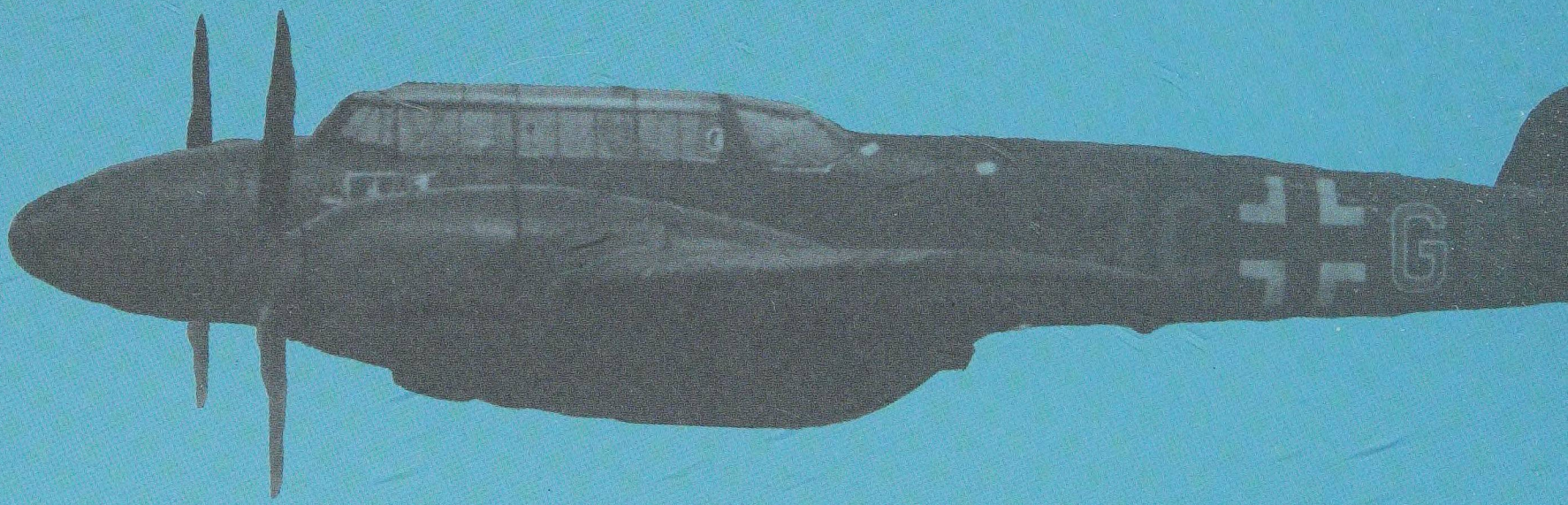
LEGENDS OF WARFARE

AVIATION

Messerschmitt Bf 110

The *Luftwaffe's* Fighter-Destroyer in World War II

RON MACKAY



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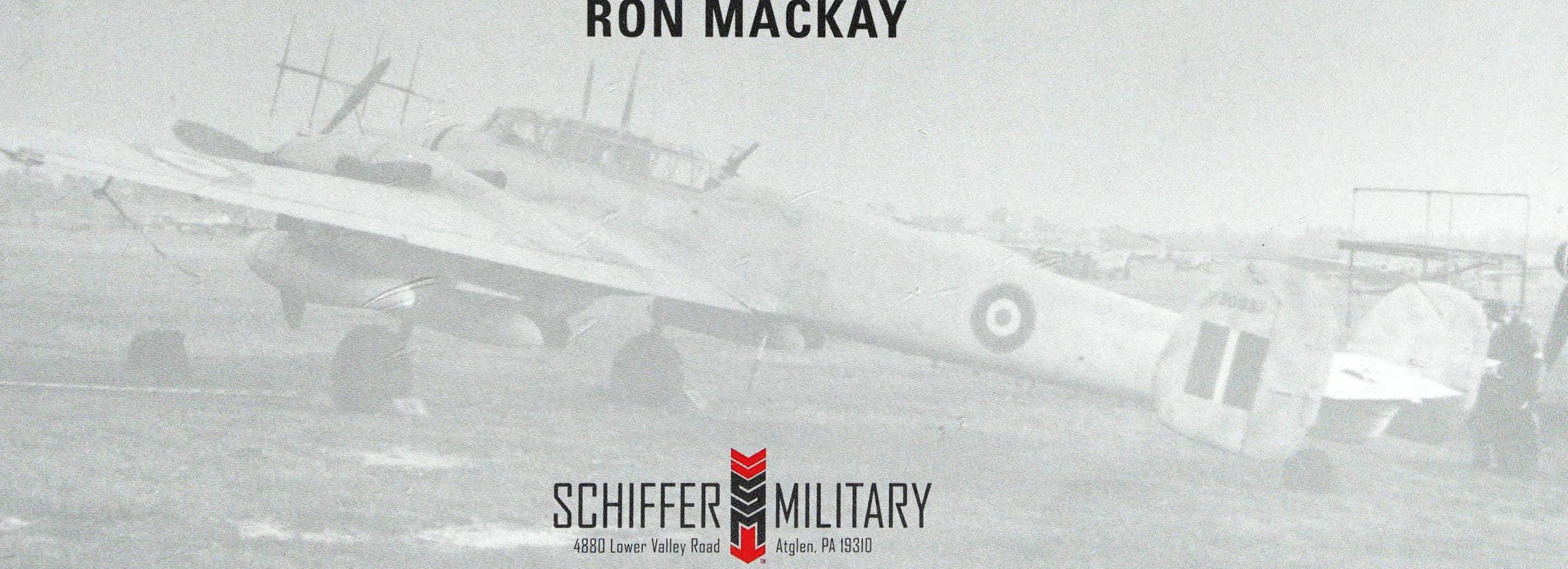

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Acknowledgments

This is my second published account of the Luftwaffe's twin-engine design, of which so much was confidently anticipated in terms of daylight operations but which ironically was elevated from its failure in challenging its single-engine adversaries to one of key importance to the national defensive structure during the hours of darkness. The *Nachtjagd* counterassault against RAF Bomber Command witnessed the aircraft's resurrection from primary failure as a *Zerstörer* to becoming a burgeoning threat to the RAF Bombing Offensive's effective execution.

This book owes so much to several individuals who assisted me over the past twenty years. Martin Bowman, Mark Postelthwaite, John Vasco, Simon Parry, and Jim Crow are the principal individuals who have provided me with the essential drive to present this book, which also utilizes my involvement with the German language, so central to my interest in the subject.

I further have a personal involvement in this subject; my uncle was a member of Bomber Command who flew and fought, as did the airmen of the *Nachtjagd*, with all doing their duty for their respective nations. Having been involved with so many airmen on both sides who fought in World War II, I trust that this book will illustrate the communality between the surviving combatants whom fortune has granted the immeasurable privilege of living out a normal life span.

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CHAPTER 1

Bf 110V (Versuchs)

During the mid-1930s the major air forces accelerated the technical transition from fixed-landing-gear biplane designs to more-streamlined monoplane equivalents; with fighters the overall trend favored single-engine layouts, but a signal limitation therein involved the lack of range—not so critical in a defensive role but crucial in respect of providing extended escort cover.

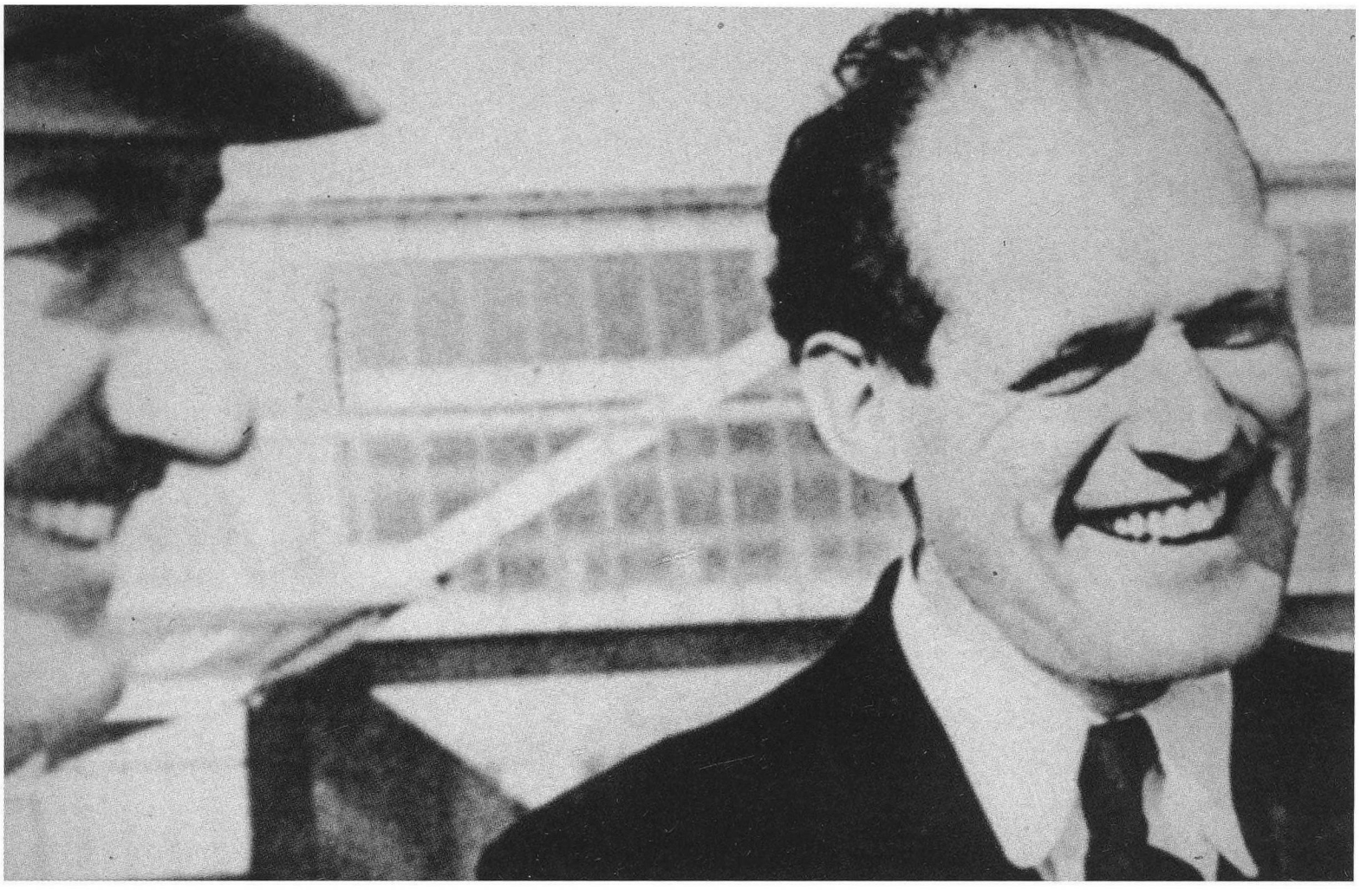
Willy Messerschmitt gave consideration to this latter operational function, but his initial concentration was directed toward what became the Bf 109, which included refinements such as slotted ailerons interconnected to the flaps and wing leading-edge slats, both combining to cancel out the worst effects of a stall when taking off and landing, thanks to the aircraft's high wing-loading factor. Several weight-saving features added to the fighter's overall high performance, while the parallel advent of the DB600 series of engines, with its direct-injection fuel system, further added to the design's combat advantage over contemporaneous adversaries reliant on carburetor-functioning engines.

However, by the time the Bf 109 prototype was functioning, its designer was focusing on a twin-engine stablemate. This aircraft would fulfill the long-distance equivalent function for the Luftwaffe's bombers in terms of escort cover. On the other hand the emergence of the He 111, with a maximum speed well in excess of current biplane fighter designs, tended to breed a dangerous sense of complacency as to the parallel need for fighter cover; the RAF's Blenheim and Wellington equivalent designs were creating a similar complacent image that would rebound on all these future national adversaries.

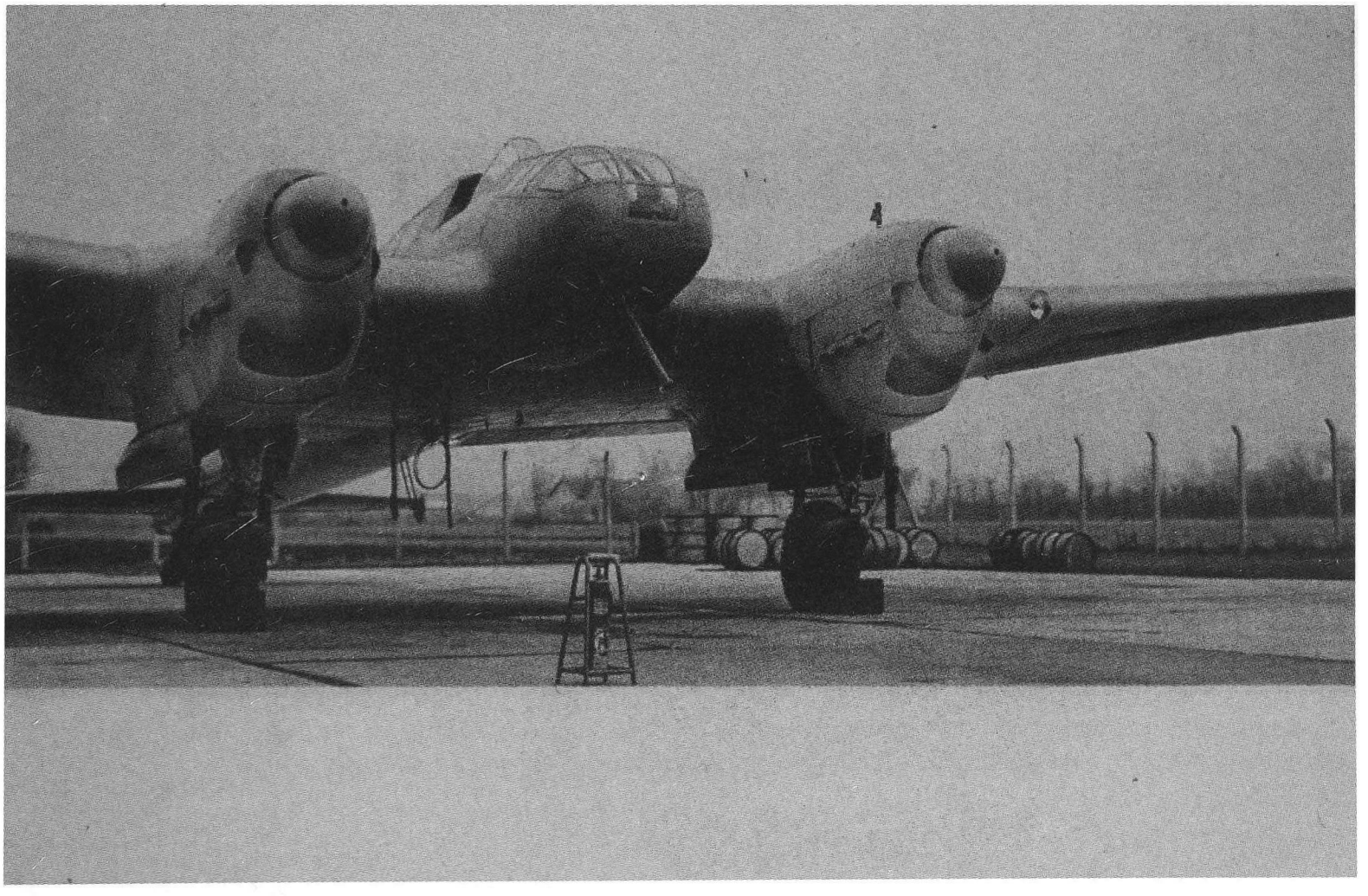
Messerschmitt faced competition from the Focke-Wulf and Henschel concerns from among six other challengers following the *Reichluftfahrtministerium*'s (RLM) 1934 requirement for a twin-engine, multirole aircraft. He removed the internal bombload element from his presentation, a factor that ironically worked to his advantage when the specification was altered to a separate *Kampfzerstörer* (bomber-destroyer) function; what would evolve as the Bf 110 in the latter role was paralleled by him in the form of the Bf 163 *Schnellbomber*, although it would never develop beyond the prototype stage.

The nascent prototype airframe was built at the Bayerische Flugzeugwerke (BFW) in Augsburg, with the entity's title later changing to Messerschmitt Aktiengesellschaft (AG). The basic conventional layout involved a low-wing, metal-constructed airframe, albeit with fabric-covered control surfaces. The elongated cockpit could accommodate three aircrew, although the initial complement was two. Power would involve the DB600 engine, rated at 900 hp, but production delays would see a temporary use of the Jumo 210-series engine on the A-O preproduction batch.

The driving force behind the design of the Bf 110, as with other Messerschmitt designs, was the individual giving his surname to the company's title. *Herr* Willy is photographed with the French minister for air, Gen. Joseph Vuillemin, during the latter's 1938 visit to Germany. The quality and quantity of aircraft available to Herman Göring's Luftwaffe must have impressed—if not also depressed—him when compared to the French air force's current state. Within two years that disparity would prove fatal for the Allied cause.



The Focke-Wulf Co. was one of two competitors for the *Kampfzerstörer* contract alongside the Bf 110. The dimensions of the design, particularly its 82-foot wingspan, was virtually double that of its Messerschmitt and Henschel 124 challengers. The overall performance during testing proved well below the standards demanded under the *Reichluftfahrt-misisterium* (RLM or Air Ministry) contract's terms. Two further prototypes were constructed, but their predecessor's fatal crash in 1936 saw all further development halted.



Construction
Attention was given to several mass-production aspects, including (1) design simplification, (2) practical assembly, (3) minimum variety of structural shapes and sheet gauges, and (4) elimination of close limits and clearances.

Fuselage
The fuselage embodied a simple monocoque design from nose to tailplane bulkhead. The symmetrical fuselage halves were completed in vertical jigs, a process permitting full access and swifter fitting of wiring, plumbing, and control mechanisms than on an already fully formed airframe. Three subsections—nose, cockpit length, and rear fuselage—of aluminum-alloy sheet bands formed each substructure, with the edges of each alternate band rolled over into "Z" sections to form integral bulkhead rings. The bands adjacent to the formed sheets were flat sheets sprung into place, the whole joined by flush riveting and joggled joints to create a structure free from internal bracing members. The fuselage halves were linked for final assembly by using two rows of rivets inserted into hat section stringers applied and located on the upper and lower centerlines. The completed fuselage was ovoid in pattern apart from around the area where the wings were fitted; here the fuselage was flattened to match up with the wing undersides.

Four more V-prefixed Bf 110 prototypes were constructed following the first example registered as D-AHOA taking to the air on May 12, 1936. The silver finish on the fourth prototype, D-AISY, in the right background contrasts with the *Schwartzgruen/Dunkelgruen/Hellblau* (black-green/dark-green/light-blue) early camouflage pattern adopted by the Luftwaffe on its companion. Note the recess behind the nearside aircraft's tail wheel, which accommodated the unit on the 110A-0 series of four airframes. As it was, the Bf 110 from the B-0 series onward retained the wheel in a fixed position.

Wings

The wing was an all-metal monospar structure comprising two panels attaching directly to a truss structure positioned within the fuselage framing. The single main spar, positioned at 38.75 degrees of wing chord, spanned each panel's width. Two subspars, positioned at 4 and 68 degrees of chord, went between the wing roots and inner engine nacelles; these bore the four fuel tanks, located either side of the main spar, and also provided antitorsion load strength. The wing root / inner nacelle widths possessed no ribs but were fitted with closely spaced inverted hat-section stringers and chordwise stiffeners. The outer wing sections possessed light lattice ribs 18 inches apart, Z-section stiffeners, and mainly hat-section stringers. The wing leading edges were fitted with automatic operating slats extending along the outer wings, whose 10-foot, 8-inch span corresponded to that of the ailerons. The overall wing surfaces consisted of light-metal, stressed-skin panels riveted in place. Total span was 53 feet, 5 inches (16.3 meters), wing area was 414 square feet (38.5 square meters [m2]), aspect ratio was 7.3:1, and structural weight was 4.8 pounds / square foot (23.43 kilograms [kg]/m2).

The ailerons were also slotted, and their aluminum-alloy sheet nose sections extended back to a full spanwise spar, the combination providing a rigid torque bar; trim tabs were fitted on the inner lengths. The surfaces were fabric, and external horn-type mass balances were fitted underneath. The metal-based, camber-type flaps, extending 13.62 feet from the wing roots, were also slotted. A single spar held ribs positioned at 10-inch intervals; the flaps were hung on three hinges whose brackets were attached to rib ends. The undersurface was metal covered ahead of and fabric covered behind the spar, and the assembly formed part of the underwing surface when retracted.

Tailplane

The stabilizer comprised a single-piece straight-tapered unit with a 1.2:1 width ratio, extending from fuselage to vertical fins and rudders. An advance over conventional structures lay in an ability to lower the leading edge 2 inches to create a 4½ degree of incidence, this being due to its being linked with the flaps—truly a forerunner of modern aircraft-control technology. The single spar was located at 40 degrees of chord; two stringers added strength while hat-section stiffeners and Z-section ribs at 10-inch intervals completed the internal layout. Twin formed sheets spliced by twin rows of flush rivets covered the frame, and the leading edges were finished off with half-round strips screwed in place. The elevators were straight tapered from nose radius to trailing edges, and the outer ends were cut inward to permit maximum safe rudder deployment. The main spar was riveted to the nose skin, and the C channel formed ribs, with the external surface area of the elevators being fabric covered. The elevators were interchangeable after the control support brackets were replaced; the tab assemblies were adjusted by replacing the control levers.

The fins were all-metal, stressed-skin units similar in structure to the stabilizer and were built in symmetrical halves. Each was a stamped unit, with a flange positioned around the leading edge for assembly riveting, and a formed angle providing stiffness. Both were offset to port when attached to the stabilizer, in order to counteract engine torque effect. Twin main spars were fitted at the aft end. Two closely-spaced main-spars, the rear one at fifty degrees chord, "Z" section ribs, and hat-section stiffeners comprised the internal framework. Three pin joints linked the fin to the stabilizer, and mass balances were placed internally.

The rudders possessed a vertical forward edge almost to the top before angling forward to parallel the fin's similarly angled top. The rudders' trailing edges were elliptical. The structure was similar to the elevators, and there were three fin attachments points, with the center one incorporating the control lever. Aerodynamic horn balances were fitted and the trim tabs were adjustable from the cockpit. The rudders were interchangeable after the control levers had been replaced.

Armament

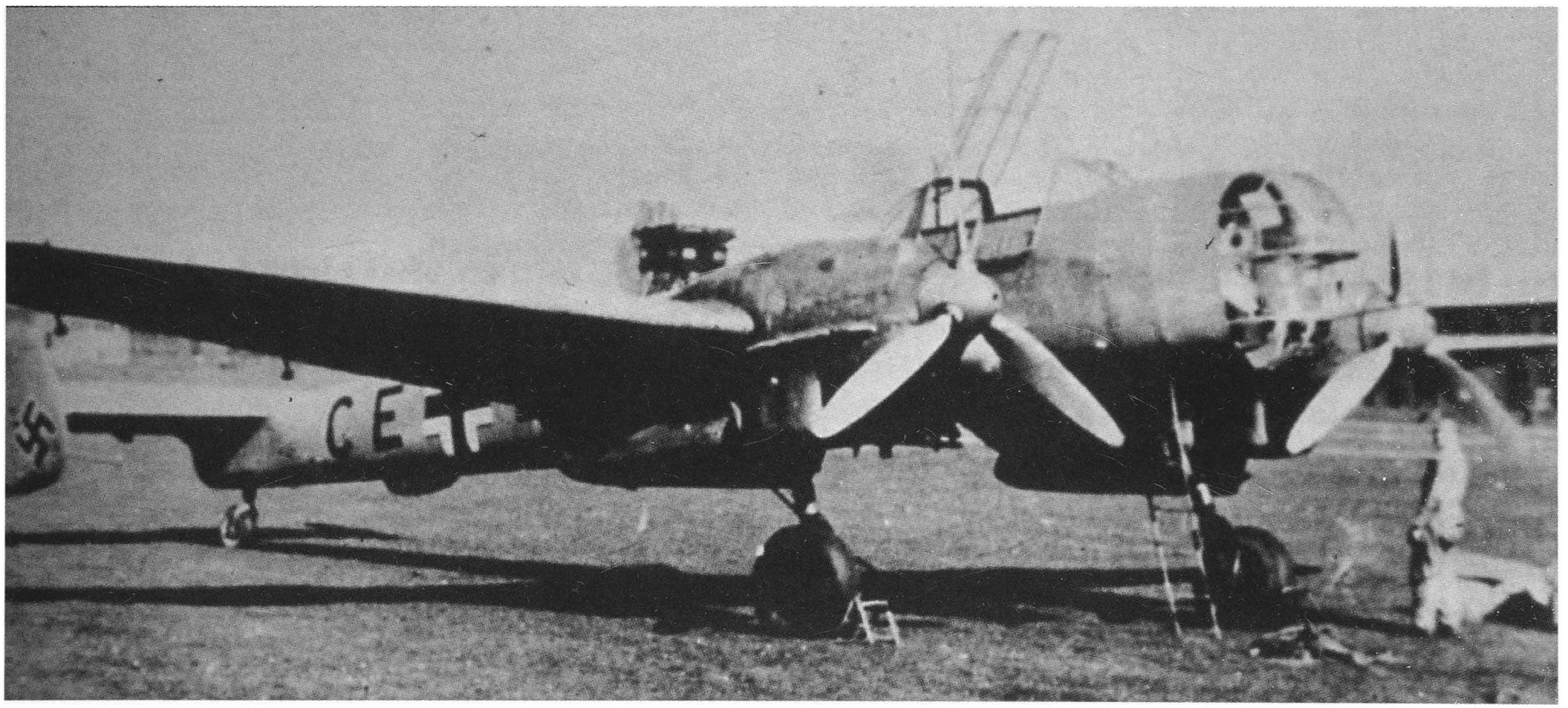
The Bf 110 airframe, with its sizeable nose compartment, promised an equally sizeable weight of offensive armament. The Luftwaffe would prove to be well ahead of Fighter Command, or indeed most other RAF aircraft designs, in examining the feasibility of introducing cannon-caliber weaponry. In the case of the Bf 110, twin MG/FF 20 mm guns were to be introduced, not on the V series of airframes or even the first preproduction AO batch—the latter along with D-AHII bearing just four MG17 machine guns of 7.92 mm caliber—but on the BO batch. The 180 rounds for each MG/FF supplemented the 1,000 rounds per MG17. This combination was to confer a strike advantage, at least in theory, when engaging with the Spitfire or Hurricane—although both sported eight machine guns, these were of .303 caliber; worse still was the paltry 350 rounds per gun (rpg), which not only provided an inferior striking force but allowed for barely fourteen seconds of firing before the ammunition was exhausted. Rearward defensive provision was in contrast minimal, since it consisted of a single 7.92 mm MG15. This vulnerability was reduced only on later variants, when the MG81 Z (*Zwilling*, "twin") entered service, but by then the design's overall extreme vulnerability to Allied fighters during daylight hours ultimately witnessed its wholesale withdrawal, primarily from other-than-nocturnal operations.

Prototype Testing

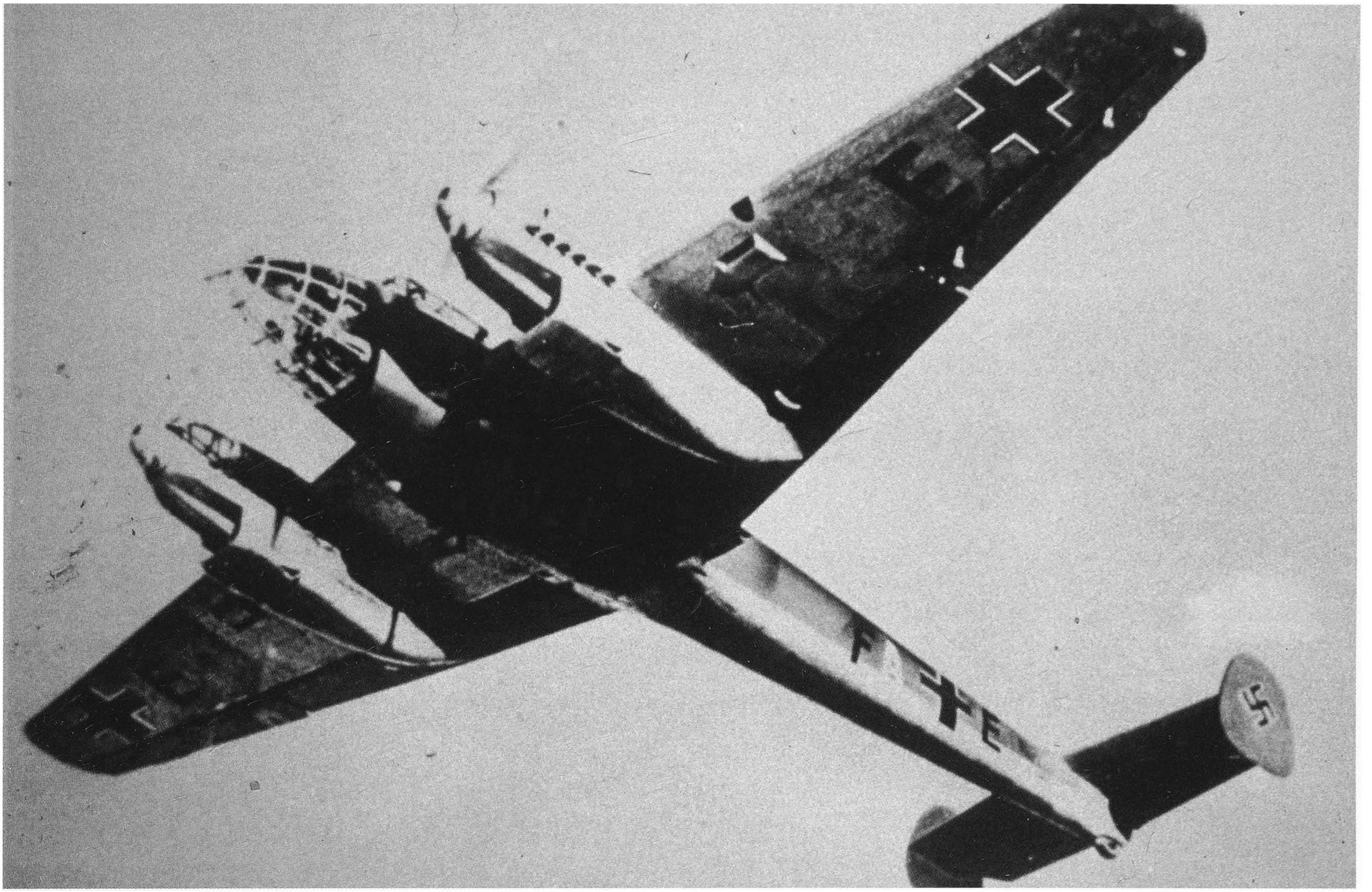
On May 12, 1936, D-OHOA was rolled out ready for its initial flight. The airframe bore the DB600 engine, intended for future production line installation; the variable-pitch propellers were VDM (Vereinigte Deutsche Metallwerke) metal units that would be a standard Bf 110 feature. The Bf 110V-1 ("V" standing for *Versuchs*, or experimental) was taken by *Dr. Ing.* Wurster for a series of taxi runs, after which satisfactory progress he took the aircraft aloft. Although short in duration, the test pilot checked out all control surfaces and also conducted stability checks through all three axes. On return he reported a high degree of overall efficiency; even stall testing elicited just a nose drop as opposed to either a lateral drop or spin reaction.

Throughout 1936, further test flights were made by what was the first of five V-suffixed airframes. In October, D-AQYE/V2, with modifications to the landing gear and tail surfaces, took to the air and the following January was dispatched to the *Erprobungsstelle* at Rechlin for a two-week service acceptance trial. Aerobatic, diving, landing, and take-off efficiency under full All-Up-Weight (AUW) conditions was fully measured. Four further prototypes, D-ATII/V3 and D-AISY/V4, D-AAHI/V5, and another airframe that bore no civilian registration letters but was listed as V7 and was the first to bear Luftwaffe markings, rolled off the line during 1936–37 (D-ATII was the first to carry armament in the form of four MG17 machine guns and along with V7 constituted the first two B-O-suffixed airframes).

An interesting test feature was a mock combat between a Bf 109 flown by the World War I *Experte* (ace) Ernst Udet and D-OHOA. The results proved quite favorable for the Bf 110, particularly in a sustained tight turn, when the Bf 109 tended to ultimately fall off one wing. Subsequent events in real combat scenarios, especially during the Battle of Britain, would puncture any sense of complacency regarding coming out ahead of a single-engine adversary, however.



A separate RLM contract for a *Schnellbomber*—a concept that evolved into designs such as the Ju 88 or Mosquito—was responded to by Messerschmitt in the form of the Bf 161 and Bf 162, both retaining the overall outline of the Bf 110. The formerly named prototype, now CE+BX but originally D-ROFI, demonstrated a radical change in cockpit layout, with a foreshortened frame, while the "solid" nose is displaced by a Plexiglas frame for the bombardier. The engines appear to be DB mounts. Nothing came of the project, however.

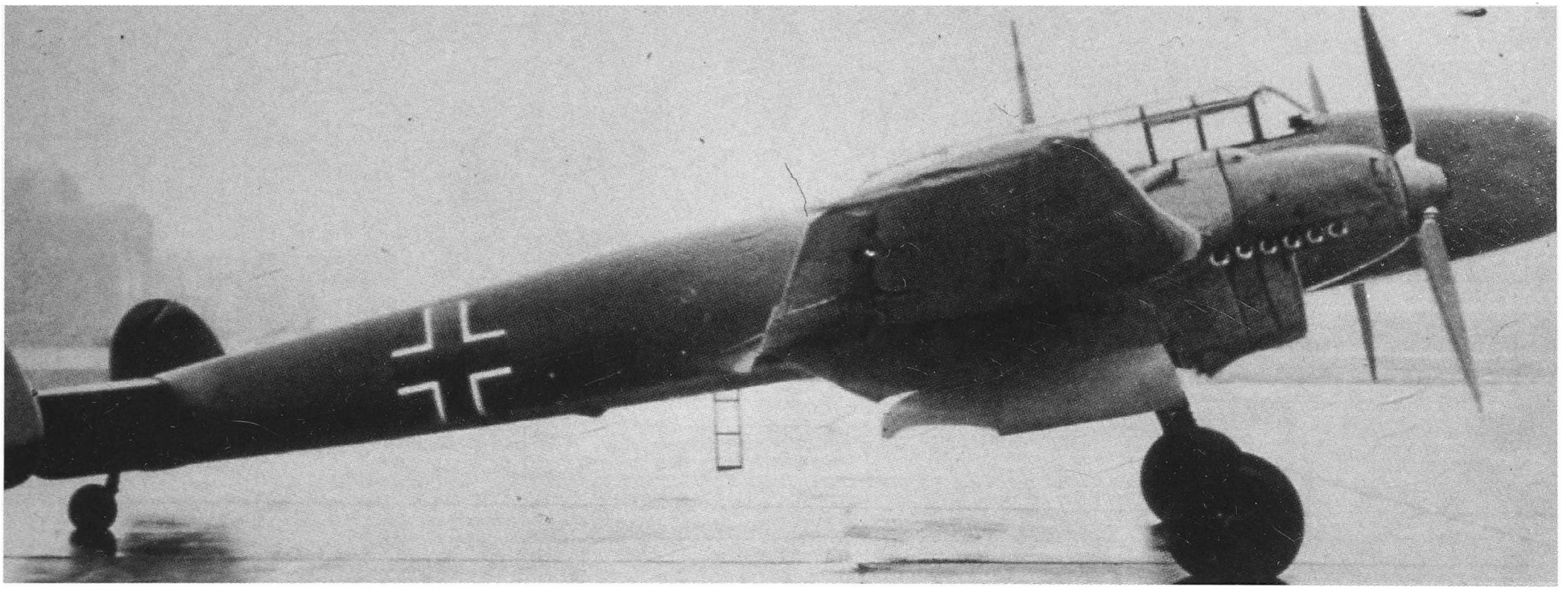


The Bf 162 seems to have retained the overall outline of the Bf 110, as viewed from this obliquely vertical angle. As with the Bf 161, its contemporary for the *Schnellbomber* contract mounts an expanded Plexiglas nose frame that denotes its intended function as a bomber. The retracted tailwheel is a carryover from the A-0 series. Neither this nor its predecessor progressed beyond the prototype stage.

CHAPTER 2

Bf 110A and Bf 110B

The flight-test program with the first four D-registered prototypes having proved basically successful, the stage was set for the interim development phase, which involved four preproduction airframes; these bore the suffix title of A-O and were constructed between August 1937 and the following March. However, the development process, although in order as regards the Bf 110's airframe, was set back to some degree in terms of the chosen power source, the DB600 series. Production delays at the Daimler-Benz plant resulted in Messerschmitt having to make a temporary (it was hoped) switch to the Jumo 210B, whose power output of 610 hp was appreciably inferior to that of its DB600 contemporary's 960 hp as utilized by the prototype series. The inevitable result was a reduction of maximum speed from 320 to 270 mph, although the overall performance does not seem to have otherwise suffered (the DB600's 320 mph maximum speed factor was marginally greater than that of the Hurricane prototype).

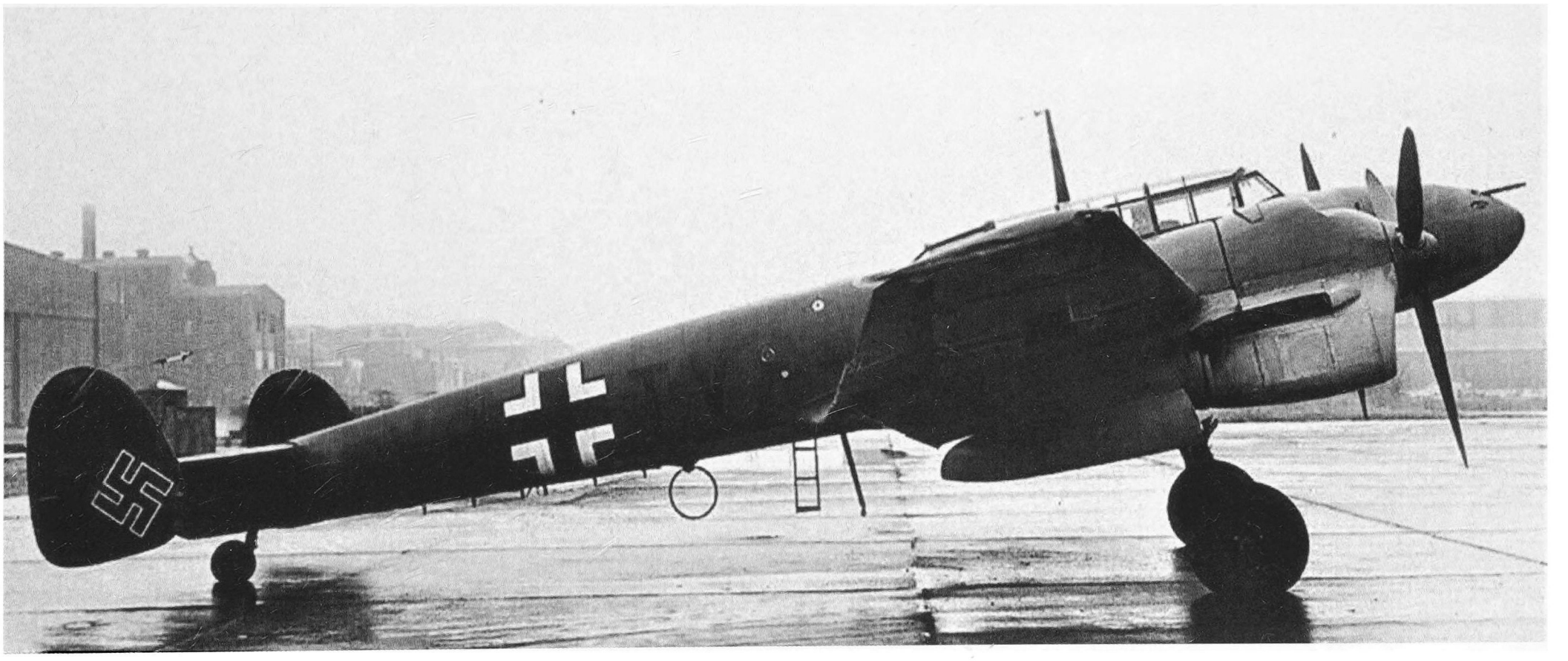


This is one of the four preproduction batch of A-0 airframes. All were equipped with the Junkers Jumo 210D engine, due to the then-current unavailability of the planned DB600A. An obvious recognition feature is the Junkers power plant's deep radiator bath.

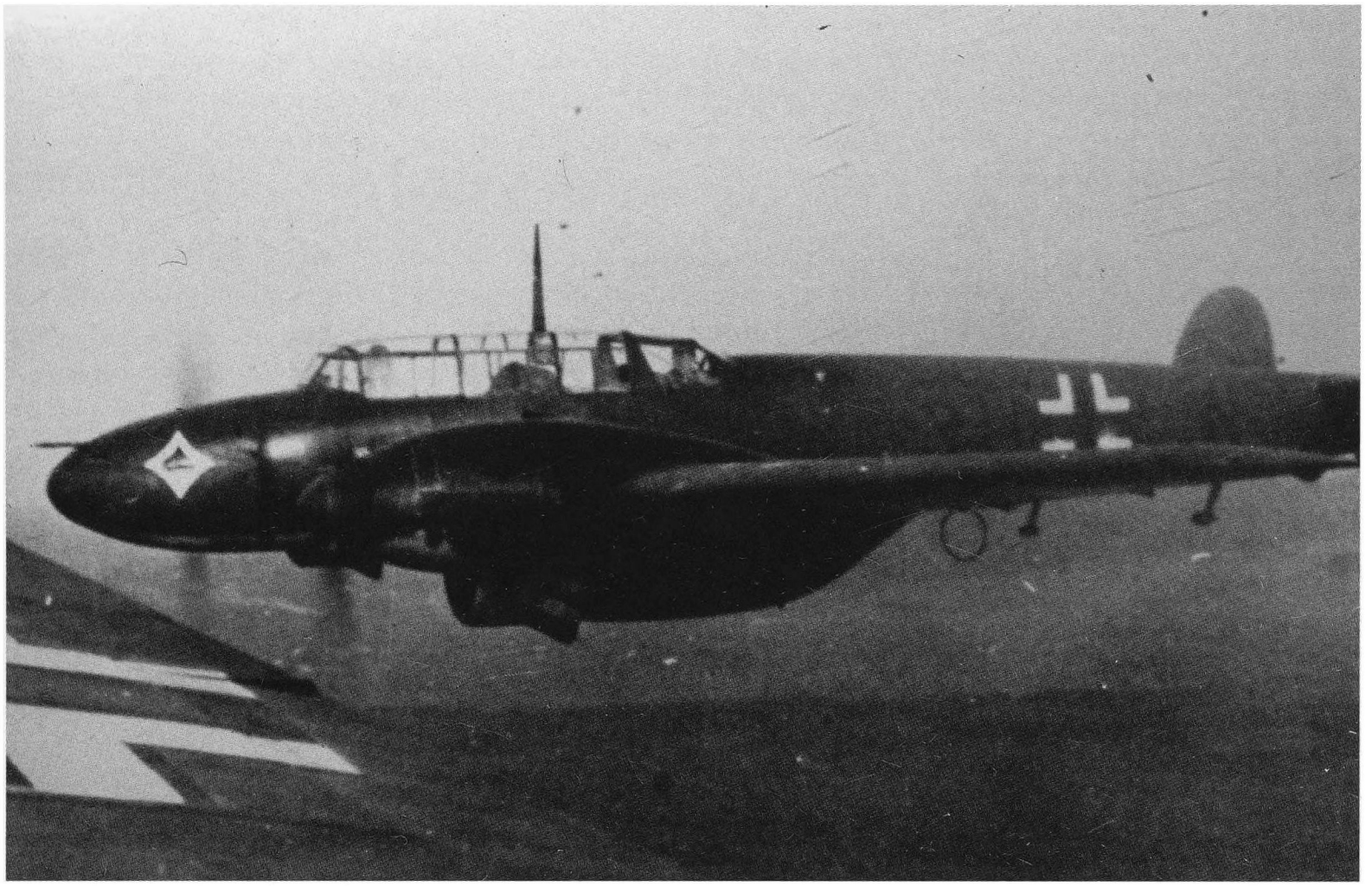
The second batch of preproduction airframes initially involved over double the A-O figure (ten), but in contrast these would just be the forerunner for a further forty airframes, with the initial duo bearing the B-O suffix, but the subsequent group of airframes designed as Bf 110B-1s. Although initially fitted with the same Jumo engine as the A-O series, a retrospective refit to the DB600A engines now on hand brought the original speed performance up to scratch. The rounded wingtips applied to the A-O series were retained while the fuselages were marginally lengthened. A change in nose outline saw the gun compartment's slightly downward-sloping underside changed to a horizontal configuration. The addition of the MG/FF 20 mm cannon in the lower nose to the upper-mounted quartet of MG17s and the single MG15 rear cockpit weapon would became the standard armament content for the Bf 110C, D, and E variants.

The stated reason for the suffix change was that these aircraft were intended to be tested in a real combat zone. Spain's Civil War was reaching its climax in favor of Generalissimo Francisco Franco's Fascist forces. Both Nazi Germany and Italy had provided a great deal of support to Franco's activities, with thousands of volunteers; in the former instance, Luftwaffe personnel had manned what was titled the *Legion Condor*. Not only were they in harmony with their political bedfellows, they were developing operational experience that would stand them in initial good stead when the almost inevitable spread of conflict to the European continent would evolve.

In any event, the Civil War was concluded in early 1939, thereby precluding any prospect of operational testing for the Bf 110B-1s whether individual aircraft were in transit to or even on hand in Spain. When subsequently all on hand again within the Third Reich, the aircraft were generally transferred to research centers. One structural change arising from testing was the repositioning of the large radiator "baths" from under the engine-cowling fronts to underwing positions outboard of the engines, and encased in shallow, streamlined, rectangular frames. The B-1s' ultimate disposal was either to the *Fliegerschule* staffed by *1./(Z)LG 1*, or to *I./ZG 2*'s or *I./ZG 76*'s training *Staffeln*. Designated Bf 110B-3 at this stage, their armament was reduced but their blind-flying equipment in contrast was uprated.



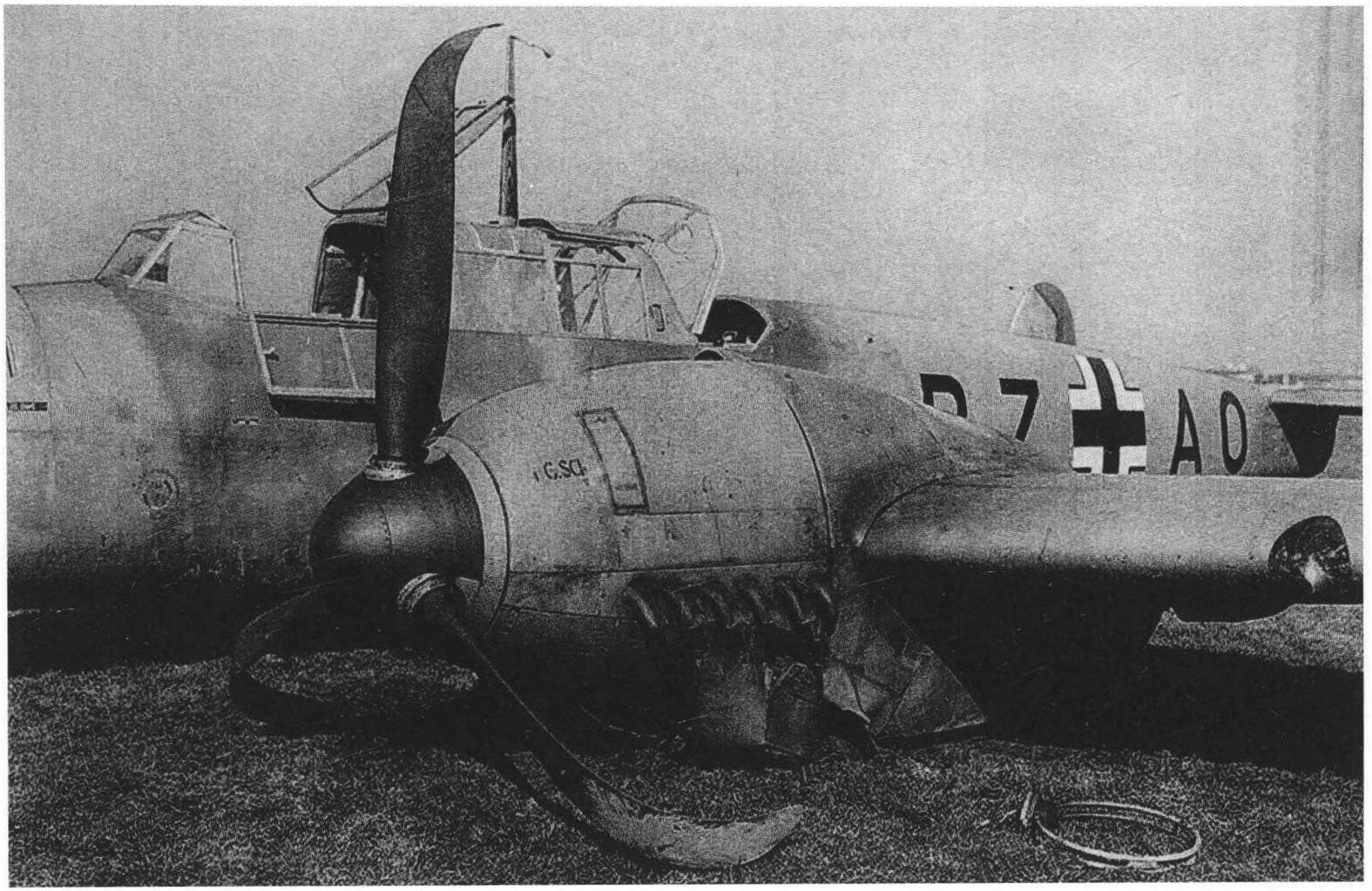
There was little change in overall outline between the Bf 110 A-0 and B-0 preproduction airframes. This is one from the latter sub-batch, which featured a marginal increase in fuselage length. The single external difference lay in the reshaping of the nose contour, which would become standard on the *Zerstörer* design from the C variant onward, albeit with a neat aperture applied to the upper tip on the E and F variants.



The two preproduction Bf 110B-0 airframes were followed by a production batch of just forty. In this case the Bf 110B is part of a *5./ZG 26* (formerly *5./JG 142*) formation. This unit was one of several *Schwere Jagdgruppen* changing to the *Zerstörer* category on January 1, 1939. The deep radiator bath is still a feature but would be replaced by the much-shallower aperture mounted on the DB601 series from the Bf 110C onward.

A Bf 110B shares a hangar with what appears to be a Do 17P bomber. Although of indifferent quality, the photo angle again and more obviously demonstrates the deep annular design of the radiator baths on the Jumo 210 engines. The dull, two-tone top camouflage pattern is marginally relieved by the white spinner cover tips.

The Bf 110B's frontline service with the Luftwaffe hardly extended beyond the beginning of World War II. A number of those relegated to secondary duties ended up with *Ergenzungsschuele* (training schools). This aircraft, coded PZ+AO, is snapped during 1940 at the Czech airfield of Prague-Rusin. This crash landing has resulted in the port radiator bath being badly crushed by the impact.

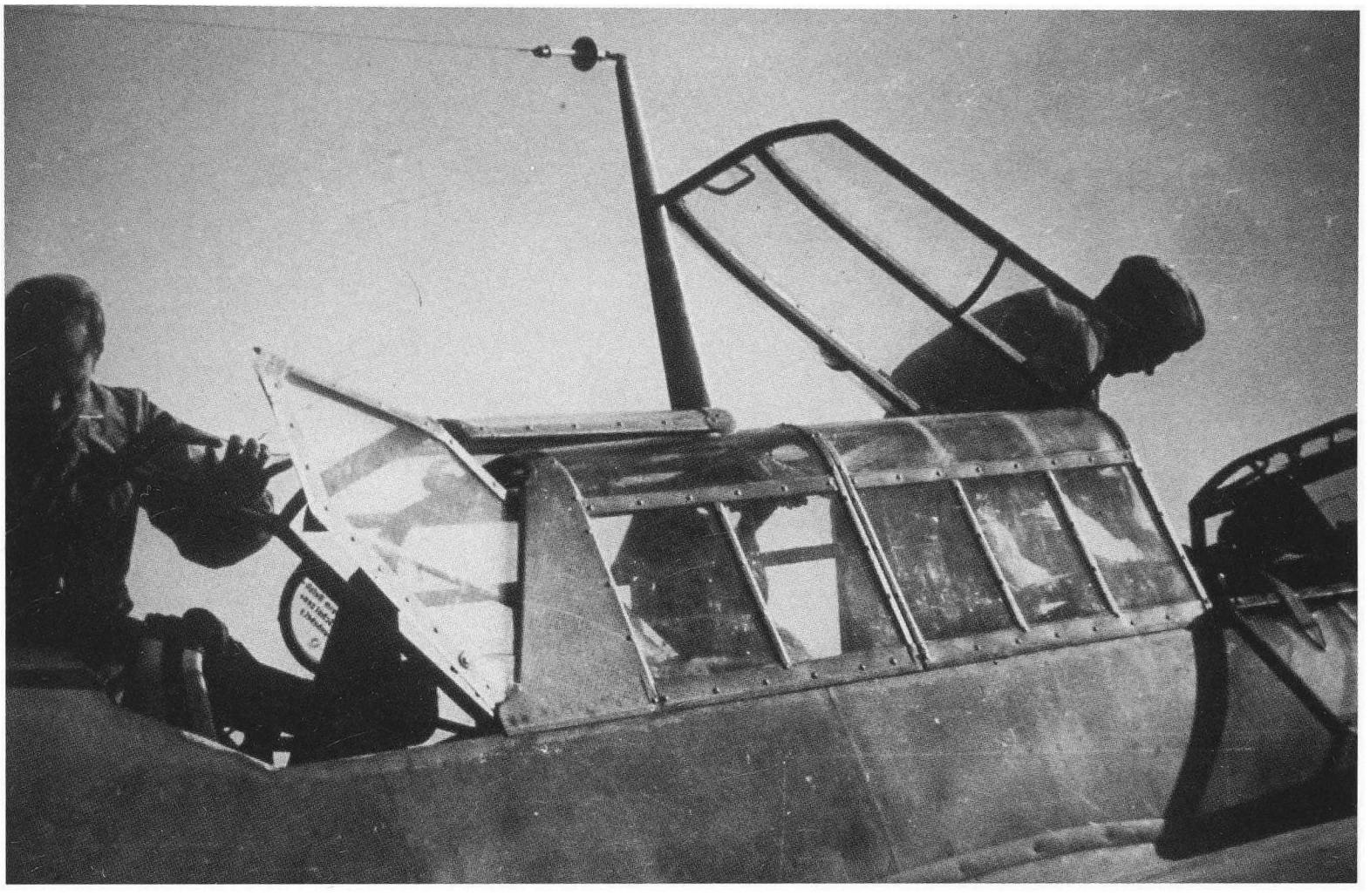


This photograph demonstrates what was to be the standard pilot's cockpit frame on the Bf 110. The roof panel is hinged at the rear to open at an angle; the twin side panels by contrast are hinged at their base to lie against the fuselage sides. The need to open all three panels before effecting an emergency exit would surely prove difficult or even fatal if not executed promptly.

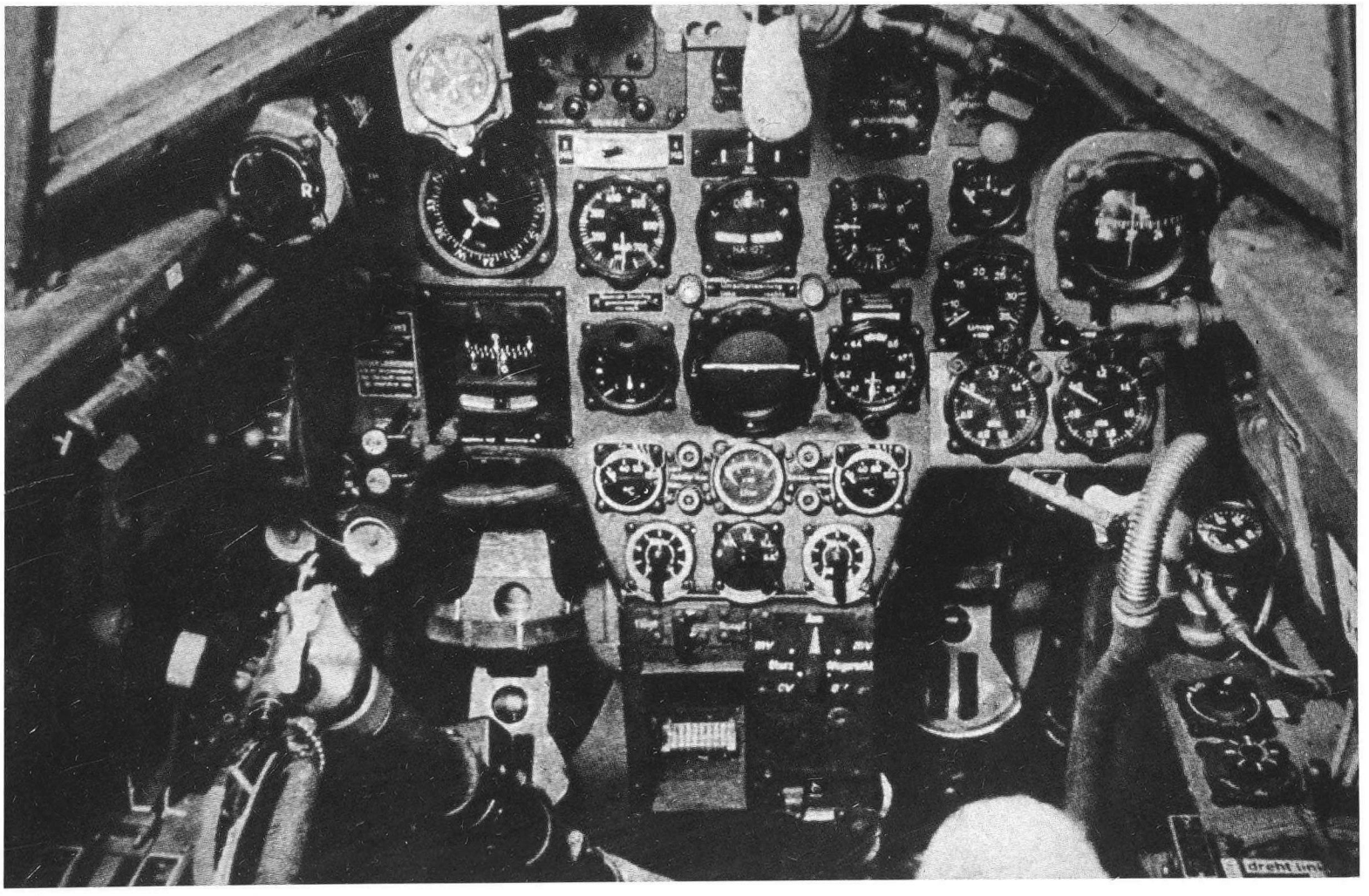
A forward view from a Bf 110's rear cockpit picks out several pieces of equipment directly behind the pilot. At the top is the cockpit instrument repeater panel, which is now centrally mounted compared to its original starboard-side location. The large circular unit is the *Peil GV* direction-finding indicator. The EL letters stand for *Empfaenger-Langwelle* (long-wave receiver), which is the sole visible portion of the multiset communications system.

The preceding photograph of what is an early Bf 110 airframe demonstrates how the pilot's seat harness for the pilot provided no support for the upper torso in the event of a violent halt, such as during a crash landing. Contrast that with this view from behind; now an inverted "U" metal frame holds the harness straps that will restrain his forward motion in such circumstances.

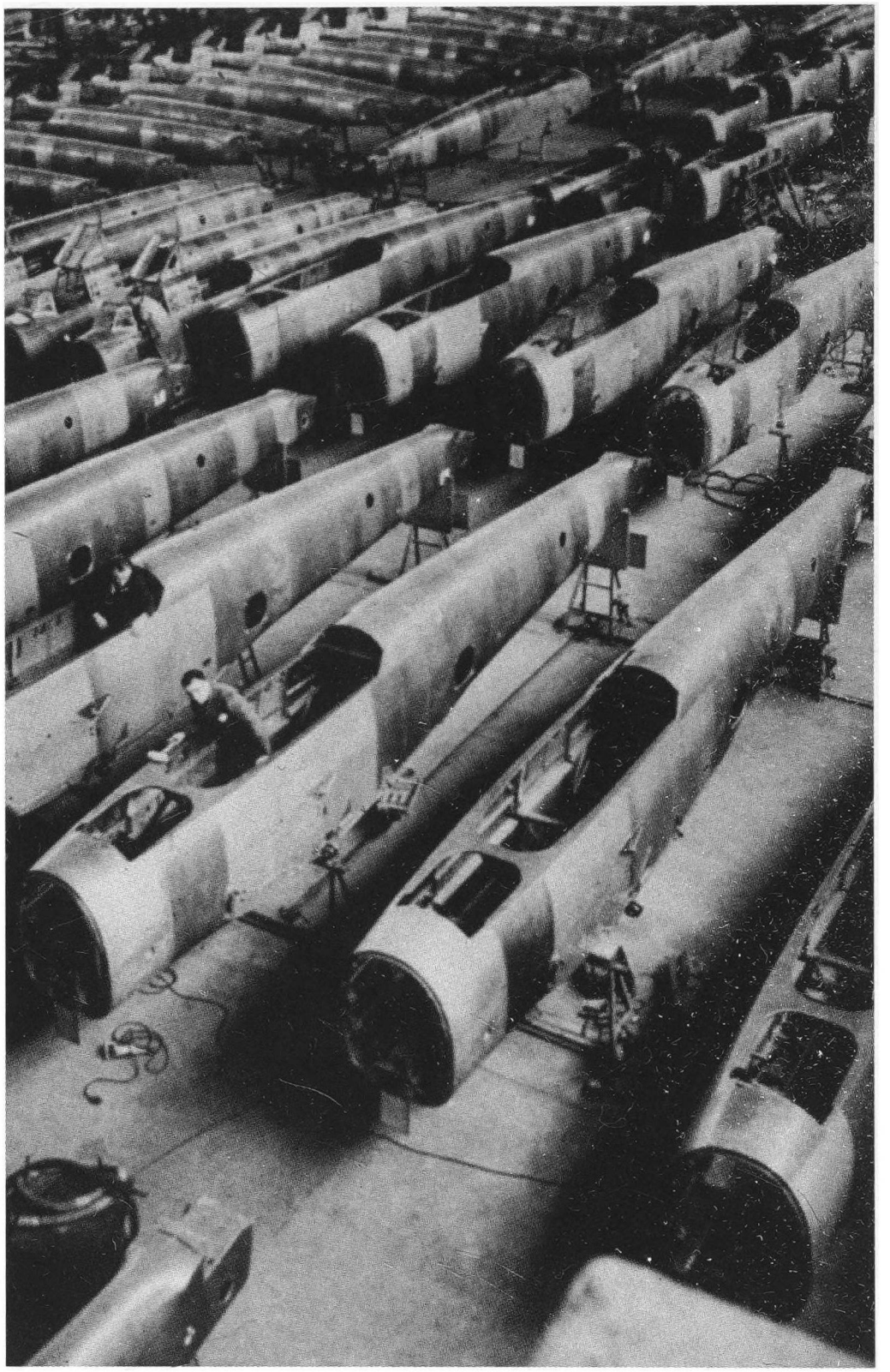
The access to the rear of the cockpit that features a two-panel layout is depicted here. The central panel lies flat against the cockpit roof, while the side panels angle up and back into the cockpit interior in a partial manner. When lowered, the angled section of the frame pulls the rear section, lying on top of the canopy back, into position to complete the cockpit's enclosure. This arrangement applied up to the Bf 110F; then, a side-hinged section directly behind the radio mast was introduced from the Bf 110F-4 onward.



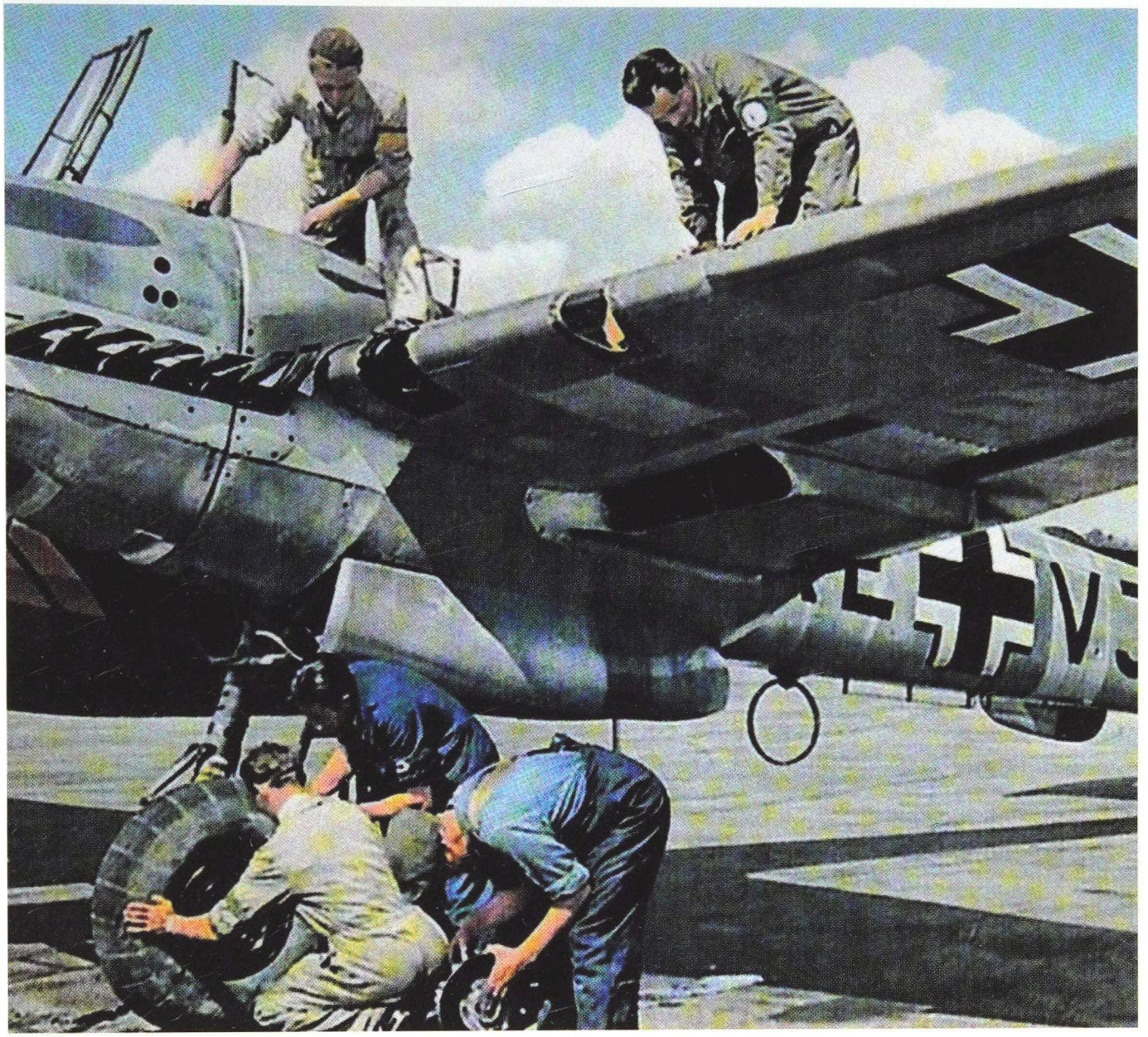
The pilot's cockpit layout on the Bf 110 did not materially change during its service life. The blind-flying panel in the center is flanked by the engine-monitoring dials. The main compass is located below the starboard side of the windscreen coaming, with the repeater compass left of the blind-flying panel, below which are the fuel- and coolant-monitoring instruments.



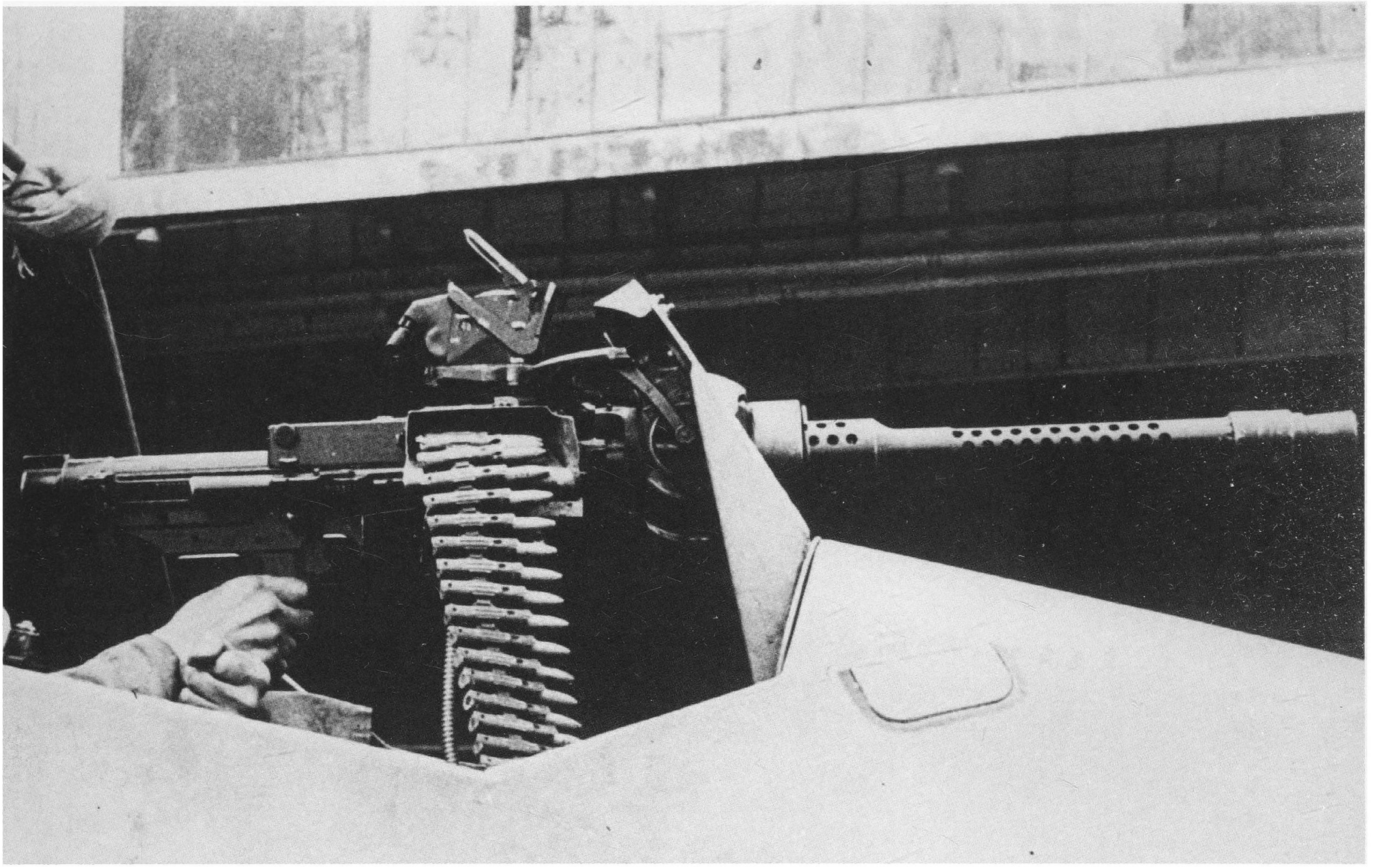
The two-man crew of a Bf 110C-1 accesses their position on the fuselage port side. The gunner *(right)* has one foot in the retractable three-step ladder as he reaches for the spring-laden handgrip with his right hand; he bears a backpack parachute, whereas his pilot's pack fits into his cockpit seat. Both men wear light-pattern flight suits and helmets. Note the single "solid" rear cockpit frame, as well as the handgrip with which the gunner draws it down.



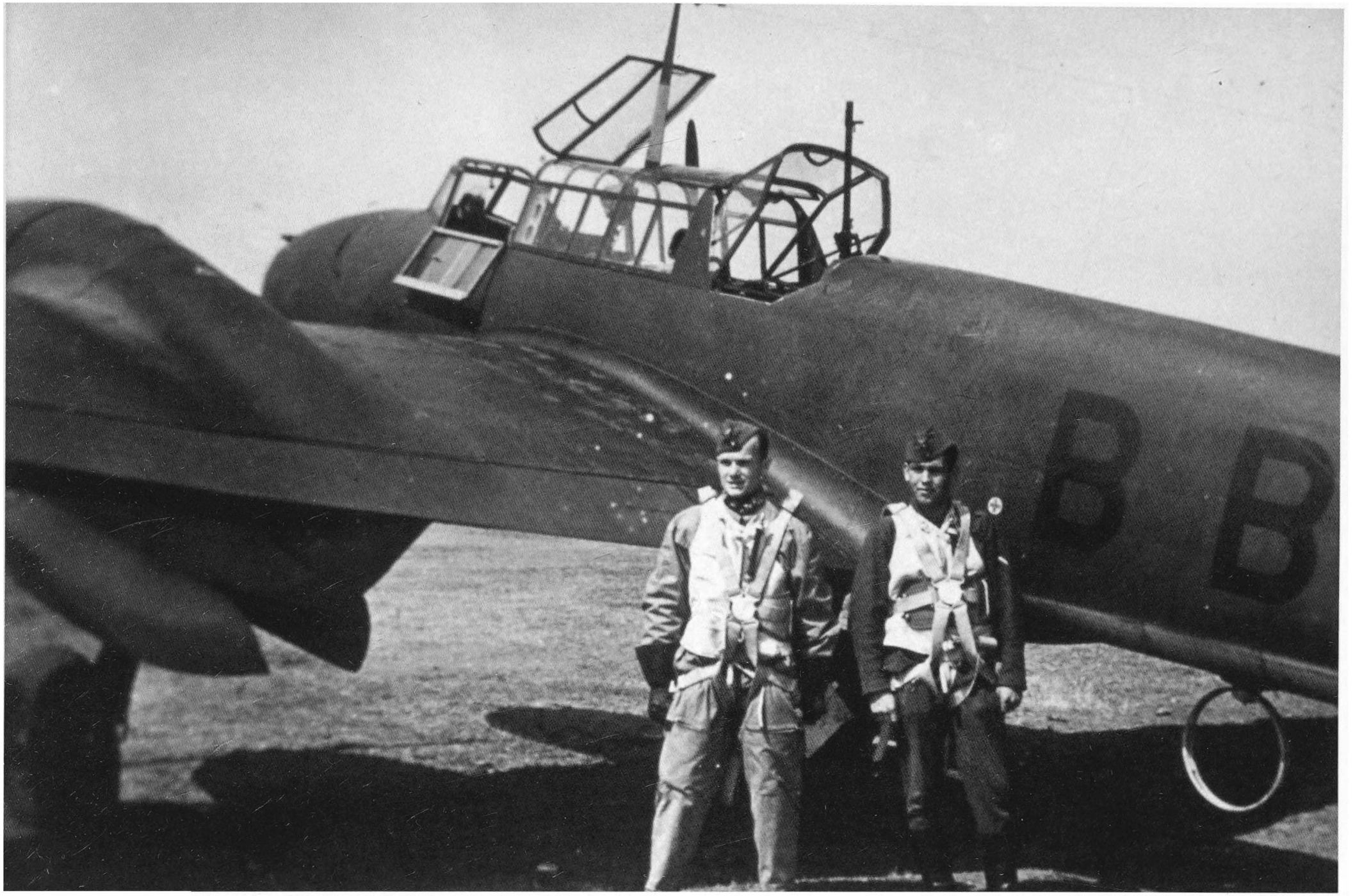
This Bf 110 production line reveals the basic layout of the design's fuselage. Separate compartments for the pilot and the remainder of the extended cockpit are on view; a bulkhead will be added between the two compartments that will support radio and later radar equipment. The fuselages seen in the left-center background have marginally advanced toward full completion, their windshields having been installed.



The four-letter factory codes on a Bf 110 and the civilian clothing of the group of individuals working busily on the airframe suggest that the aircraft is being prepared for delivery to the Luftwaffe. Points of note are the D/F loop extending below the fuselage and the distinctive cross-ribbing on the undercarriage wheel, which was a characteristic of German aviation manufacture.



The rather puny defensive firepower against rearward assault offered by the single 7.92 mm MG15 that was borne by early-production Bf 110Cs prompted the testing of more-effective alternatives. In this case the weapon is a 13 mm MG131, which moreover was equipped with a *Reflexvisier* (*Revi*) gunsight, compared to the simple vertical pin on the rear barrel end of the MG15. Whatever the reason, the MG131 was never proceeded with in terms of Bf 110 service.



A pilot and his gunner are posed in front of a factory-fresh Bf 110C prior to the duo taking the fighter aloft for an acceptance flight from the airfield at Schlessheim. The airman on the right appears to be wearing his basic uniform beneath the parachute harness, as well as standard-pattern boots. His companion is better rigged out for flying, with flying-pattern boots and a lightweight flight suit. Headgear consists of forage caps, which will be replaced by flying helmets. Picture was taken between late 1939 and 1940.

CHAPTER 3

Bf 110C

False Optimism

The initial production run of the first Bf 110 variant to enter operational service with the Luftwaffe proved to be modest in output, with just nineteen airframes turned out between April and June 1939. These were the first of a final total of 1,222 airframes for what was classified as the Bf 110C to come off the production lines up to April 1942, as envisaged under official Plan No. 10 in January 1939. Within three months, Plan No. 11 was issued, which added 368 airframes to the list as well as stating that production would begin in April and extend from the original end date of April 1941 for a further twelve months.

The period up to Nazi Germany's onrush into Poland on September 1 witnessed a steady acceleration in production, despite the nation's limited access to mineral and metal stocks with which to pursue an efficient aircraft production system. As matters transpired, the overall turnout of airframes fell twelve percent behind projected totals, a shortfall that in the Bf 110's case resulted in the September to December figure of 156 against 188. Nevertheless, by September 1, a total of 159 airframes had been produced.

On operational hand were three *Gruppen*, *I./ZG 1*, *I./(Z)LG 1*, and *I./ZG 76*. Bomber escort sorties resulted in the *Zerstörer* crews warding off attacks by the Polish PZL111 parasol-wing fighter. The fixed-landing-gear aircraft, with two rifle-caliber machine guns, were theoretically well outclassed, but the tactic of a diving approach on the Luftwaffe formations along with its pilot's skill and aggression did bring about a number of kills. On the other hand, direct fighter-to-fighter combat left the Bf 110 in the overall ascendancy other than in the turn. A better option for their charges was for the Bf 110s and Bf 109s to indulge in *freie Jagd* sorties, ranging out ahead of the bombers to pick off their adversaries before they could get close enough to launch attacks. The heavy armament lent itself to ground strafing, and with the relative lack of aerial opposition, these operations could be indulged in; sometimes this duty would be carried out prior to making a rendezvous with their bomber charges, the design's ability to fly for several hours ensuring that both functions could be safely carried out within the available fuel reserves. The Polish Campaign was concluded within a brutally short time period, after which the Luftwaffe settled down to await the next comprehensive call to action. Little did the personnel know that that call would be delayed for nearly eight months as the "Phony War" or *Sitzkrieg* came into play.

The Nazi/Soviet Pact permitted Hitler to concentrate his attention on the Western Front, but it was RAF Bomber Command that first encountered the Bf 110, and that to its cost during daylight hours. No. 144 Sqdn. had lost an entire five-strong Hampden formation during a sweep off the northwest coast of Germany, but it was the Wellington-equipped units that would really suffer during successive reconnaissance in force sorties on December 14–18. The first occasion saw five out of twelve culled; costly as this was, worse now ensued.

The availability of long-range *Freya* radar allowed more than sufficient time for the *Jagdflieger* pilots to take off, although their reaction was slow. The Bf 109s were joined by *I./ZG 76*, which already had four Bf 110s aloft and whose *Staffelkapitän*, *Hptm.* Wolfgang Falck, picked up the Wellington's location via radio to further boost the defense force. The bomber's situation was not improved by the overall formation of twenty-two being widely separated as the action commenced. The relatively scant defensive firepower—fore and aft twin gun turrets—and a tragic lack of self-sealing fuel tanks soon left their mark, as bomber after bomber was downed. By the time the action was over, most of the eleven Wellingtons subsequently listed as MIA had gone, while a twelfth was ditched. Here was seemingly signal proof that the Bf 110's bomber-destroyer function was justified;

The Bf 110C was the first large-scale production variant of Willy Messerschmitt's twin design. Four of these aircraft are seen along with two early versions of the He 111, with their distinctive stepped-down cockpit and nose layout. Also on hand is a noncamouflaged Ju 52, whose presence indicates that the picture was taken around 1939–40. The chevron ahead of the nearside fighter's *Balkenkreuz* denotes a *Gruppe* adjutant's aircraft. Note the square wingtips, which superseded the rounded examples mounted on the Bf 110B.

One of the two crew members from this crash-landed Bf 110C leans casually but undoubtedly thankfully against the forward fuselage as he reflects on what might have been a fatal outcome. The rear fuselage has disintegrated, presumably by coming into contact with the trees, while the starboard propeller has been torn off and the port VDM propeller has been thoroughly mangled. The incident is believed to have occurred during the Polish Campaign.

The swift pace of *Blitzkrieg* operations during 1939–41 regularly left the Luftwaffe functioning under very basic conditions bereft of proper technical backup facilities. In this case the ground crew for a *ZG 26* unit has rigged a trio of wooden poles in place of a standard hoisting frame, with which they have located a DB601A-1 engine onto its bearer frame. Note the long lever attachments fitted to the engine block's lower section, with which the men are facilitating the engine's precise maneuvering into place.

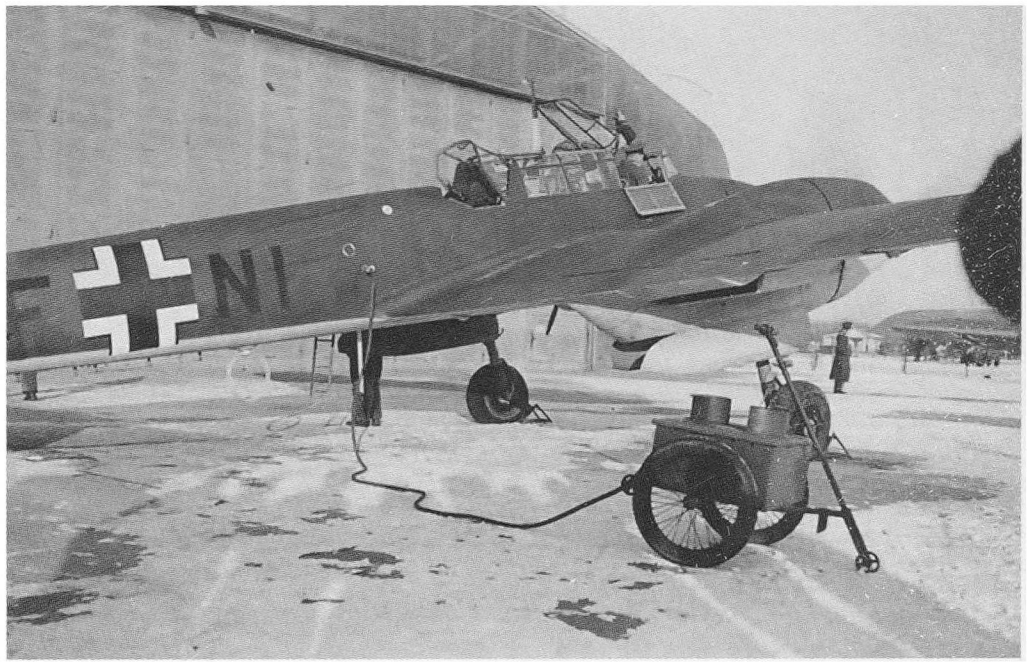
what was probably overlooked was (1) the poor bomber defensive capability and (2) a lack of fighter cover, the latter counterfactor only fully coming into play the following summer.

The false dawn of apparent overall superiority over its adversaries continued on into the middle of May. During this period, little contact was made with the Anglo/French air forces until the advent of the German invasion of France, Belgium, and Holland. Prior to this, the subjugation of Norway and Denmark had in the former instance pitched the *Zerstörer* units against a motley group of fighters primarily consisting of Gladiators that were as outpaced and outgunned as their PZL contemporaries.

By now, up to four C variations had entered service. The Bf 110C-2 possessed an improved FuG10 radio set compared to the C-1's FuGIIIua. One airframe was adapted to test out enhanced defensive armament in the form of the FDL (*Ferngerichtete Drehringlafette*) 7.92 mm gun barbettes, positioned under the center fuselage and rear cockpit with periscopic aiming sights. The experiment ended in failure, but more-practical gun barbettes would operate properly on the future Me 210 and Me 410 designs. The Bf 110C-3's current offensive armament was not increased in number, but an improved version of the MG/FF cannon was installed.

Finally, the Bf 110C-4 featured a similarly uprated cannon complement, but added crew security was fitted in the form of armor protection. In addition, some production airframes categorized as C-4/B were being equipped with ETC250 bomb racks under the central fuselage, while their DB600A engines were supplanted by the uprated DB600N, with 1,200 hp output. Prominent among the units taking on the C-4/B would be *Erprobungsgruppe* (*Epr.Gr.*) *210*, a specialist assault unit destined to make its presence felt during the Battle of Britain.

The initial indication of the Bf 110s' vulnerability began to emerge during the drive into western Europe that led up to the Dunkirk evacuation. Although the Hurricane force based on the Continent was well outnumbered, its pilots gave a solid account of themselves. Although the claims of 499 Luftwaffe aircraft kills during the first twelve days of the Battle of France were excessive, the German loss records for the same period suggested a figure of approximately 300 downed in direct aerial combats. Among this total were thirty-eight Bf 110s out of 114 operationally on hand. The need to maintain visual contact with the bombers probably inhibited the crews' ability to engage attackers on equal terms, and an element of the 123 Hurricanes downed in action must have added to the *Zerstörers*' kill figures. Nevertheless, the Luftwaffe airmen would have ended the campaign with a more sober anticipation of what lay ahead as plans were being made to attack Great Britain.



The massive hangar structure at Magdeburg-Ost forms a backdrop for a Bf 110C-2 with factory codes CF+NI. A senior noncommissioned officer (NCO) who is perhaps a *Feldwebel* sits in the cockpit as he winds up the power on the starboard DB601 engine. The plugged-in mobile container is likely providing lubricants to the aircraft's system. The photograph is believed to have been shot sometime during the winter of 1939–40.

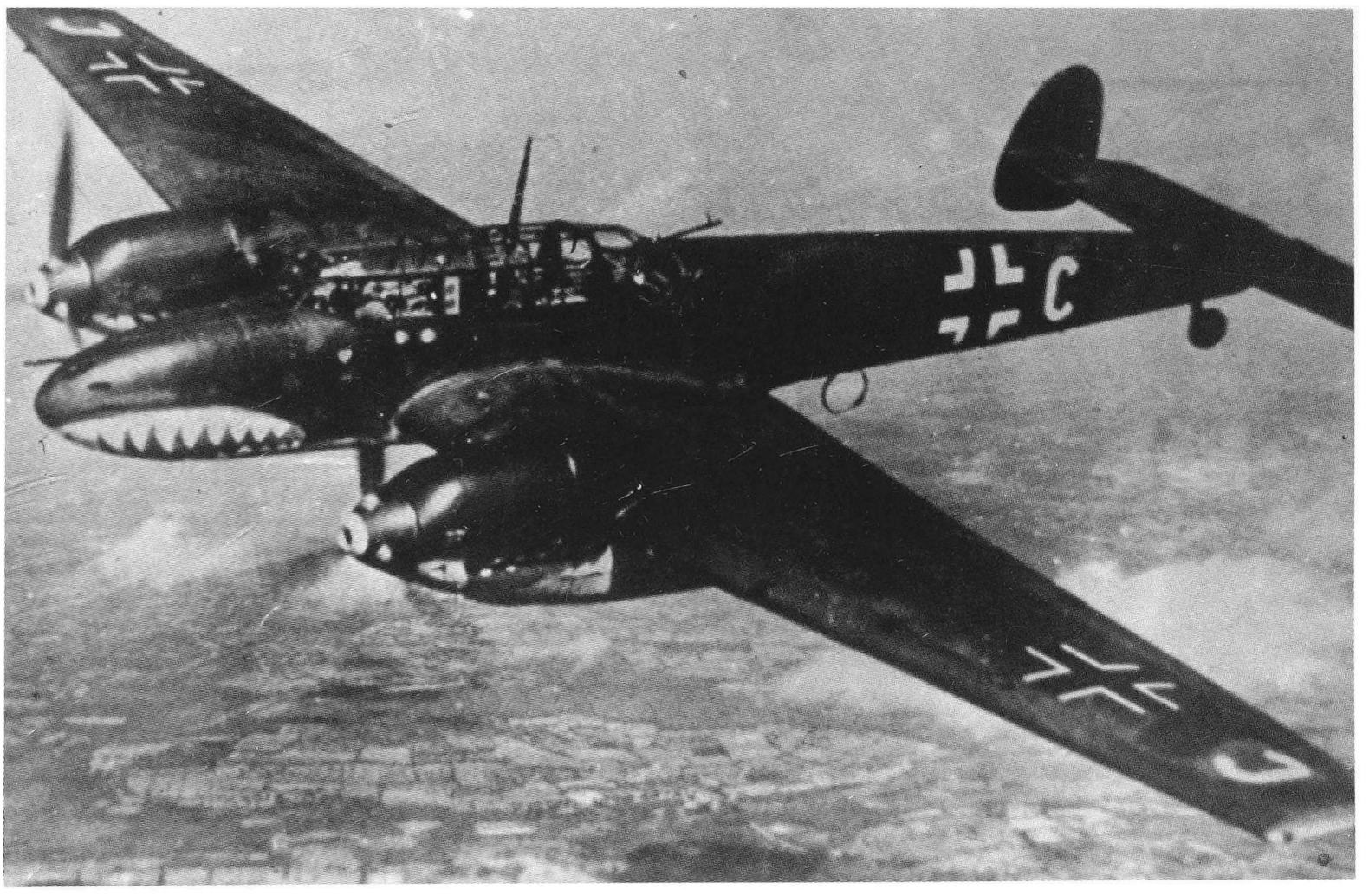
Battle of Britain Blues

The reconnaissance aspect of operations by the Bf 110 first evolved with the Bf 110C-5 and C-5/N, which were adapted C-4 airframes. The MG/FF cannon were removed and an Rb50/30 camera was mounted to focus vertically through the central base of the cockpit floor, which was fitted with sliding covers. The N suffix referred to the installation of the DB601N on the latter subvariant. The aircraft's long-range capability ensured its deployment in photographing the British landscape in respect of military or industrial targets, but an inevitable exposure to interception by Hurricanes or Spitfires made this a particularly dangerous activity. Maximum altitude was of prime importance, since the higher a sortie was flown, the better chance there was of avoiding contact.

One primary weakness discovered while testing captured Bf 110s during 1939–40 was the increasingly poor response when banking into a turn. The higher the speed, the longer a 45-degree bank took to achieve (200ASI—1.3 seconds, 300ASI—2.5 seconds, 400 ASI—4 seconds). The control stick pressure increased from 26.5 to 46.5 lbs. If engaged from behind, the evasive maneuver was compromised either way—a lower speed gave a more prompt control response at the sacrifice of equally prompt evasion; the higher the speed, the greater time factor in effecting a bank, which

At this initial stage of World War II, the Bf 110C bore a formidable range of forward-firing weaponry in the form of four MG 17 machine guns and two MG FF 20 mm cannons. Three among the former-named category can be seen protruding on this anonymous aircraft. Not only did this provide a formidable aerial challenge to the Polish air force during the short-lived invasion and subjugation of that country, but the design's use in ground attack operations was equally effective.

A Bf 110C from *6./ZG 76* bears the shark-mouth design that refers to the unit's title of "*Haifisch*" (Shark). The artwork is highlighted by the dull original splinter-camoflage borne by Luftwaffe fighters up to 1940. The heavy armament proved lethal to RAF bombers while attempting to pursue daylight operations in the winter of 1939–40—a critical setback that forced Bomber Command to switch to nocturnal assault for the ensuing four years up to Operation Overlord, when daylight operations were resumed.



in consequence allowed an attacker more time to bring his sights to bear. The Bf 110's wing-loading factor of 33 pounds per square foot, compared to the equivalent figure of 25 pounds on the RAF's duo of modern fighters, further worked to its disadvantage in a dogfight scenario.

A theoretical way to counter attacks was for a Bf 110 formation to adopt a circular pattern that left each fighter covering the one in front. A fighter, whether approaching from ahead or behind, would accordingly run the gauntlet of return fire from at least one Bf 110. On the other hand, the adopting of what was seen as a "defensive" maneuver by the RAF left any prospect of continued escort provision null and void. Even this tactic could be basically thwarted if the RAF pilots made a swooping as opposed to a lateral approach and, once clear of the formation, regained altitude. (Göring, when hearing the operational complaints of a unit, reportedly roared, "No more talk about a defensive circle—it's an *offensive* circle," to which one pilot later dryly commented, "well, it's still the same old circle!")

As the battle progressed, a ludicrous and logistically costly switch was made whereby the already-burdened Bf 109 *Staffeln* were in some cases ordered to escort their *Zerstörer* contemporaries. This left the bombers even more bereft of effective cover, as well as cutting down on the ability to make large-scale interceptions of the RAF fighters before they achieved contact with the bomber formations. A subsequent reallocation of the Bf 110s to cover the western section of England's Channel coast meant that they were again dependent on their own salvation, since the Bf 109's range over the much-wider stretches of water was even more inhibited than over the Pas de Calais stretch of the Channel, where most single-engine units were now stationed! Although the *Zerstörergruppen* continued to operate until the battle's conclusion, the loss scale remained constant, with several units losing near double figures on occasion. (The figure of aircraft assessed as 100 percent damaged either in action or otherwise was over 190 during the period from July 3 to September 6, with a further eighty-three placed in this category from September 7 to December 31.)

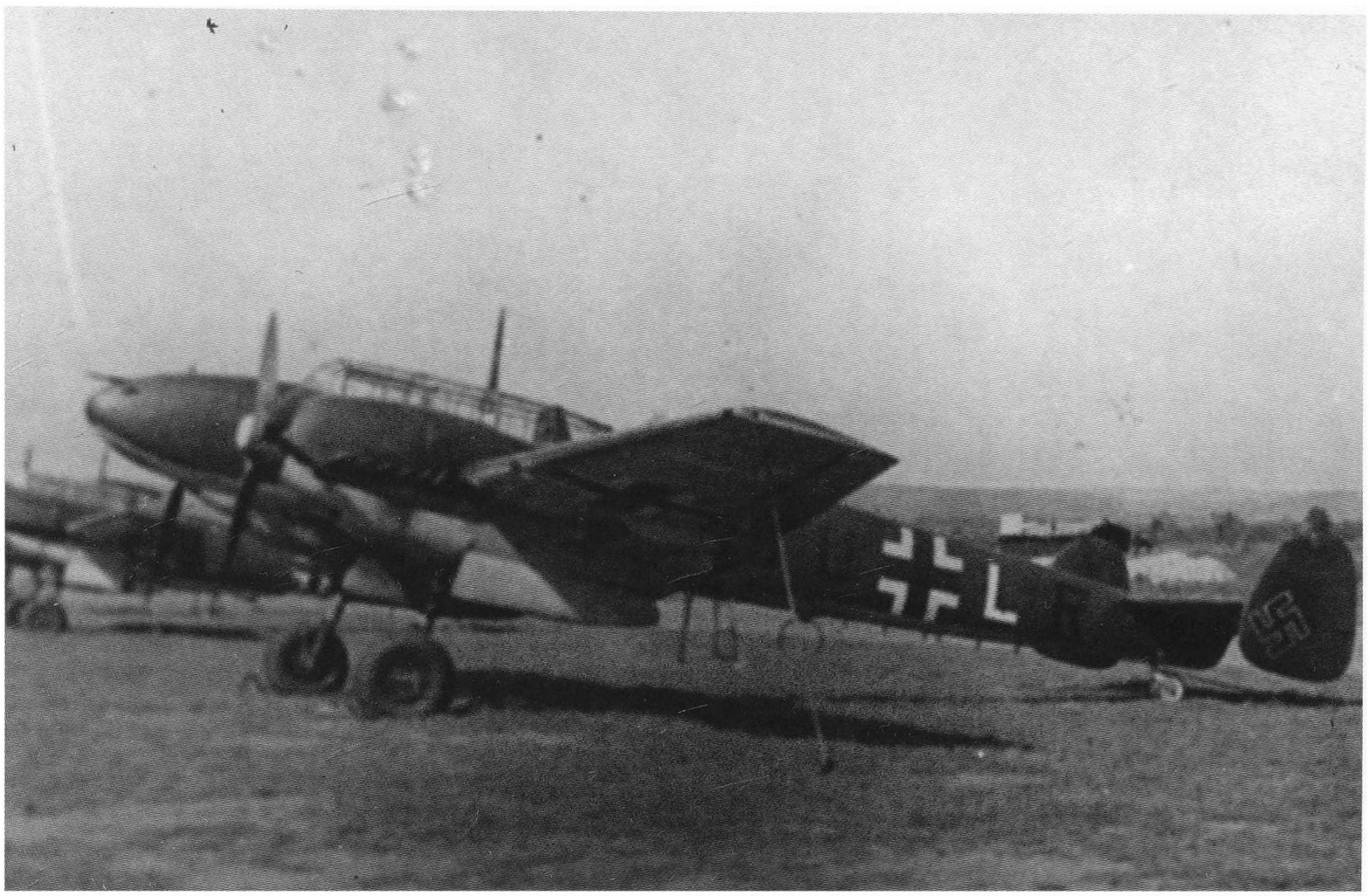
Epr.Gr. 210

Arguably the sole positive aspect of Bf 110 operations involved *Epr. Gr. 210*, two of whose three *Staffeln* utilized the C-4/B variant in fighter-bomber operations. The crews carried out pinpoint assaults on radar sites, airfields, and military production factories that inflicted painful losses in equipment and personnel in a number of instances. Even here, the successes were partially balanced out by regular losses affecting at least four senior staff among the figure, including the original *Kommandeur*, the charismatic *Hptm.* Walter Rubensdoerffer, killed on August 15. A further specialty peculiar to the *Gruppe* was the provision of the Bf 110C-6 bearing a single MG101 30 mm cannon mounted in a ventral pod that displaced the normal twin MG/FF cannon. Also on hand was the final Bf 110C variant (-7), which in effect was a C-4/B mounting DB601N engines and provided with a strengthened landing gear.

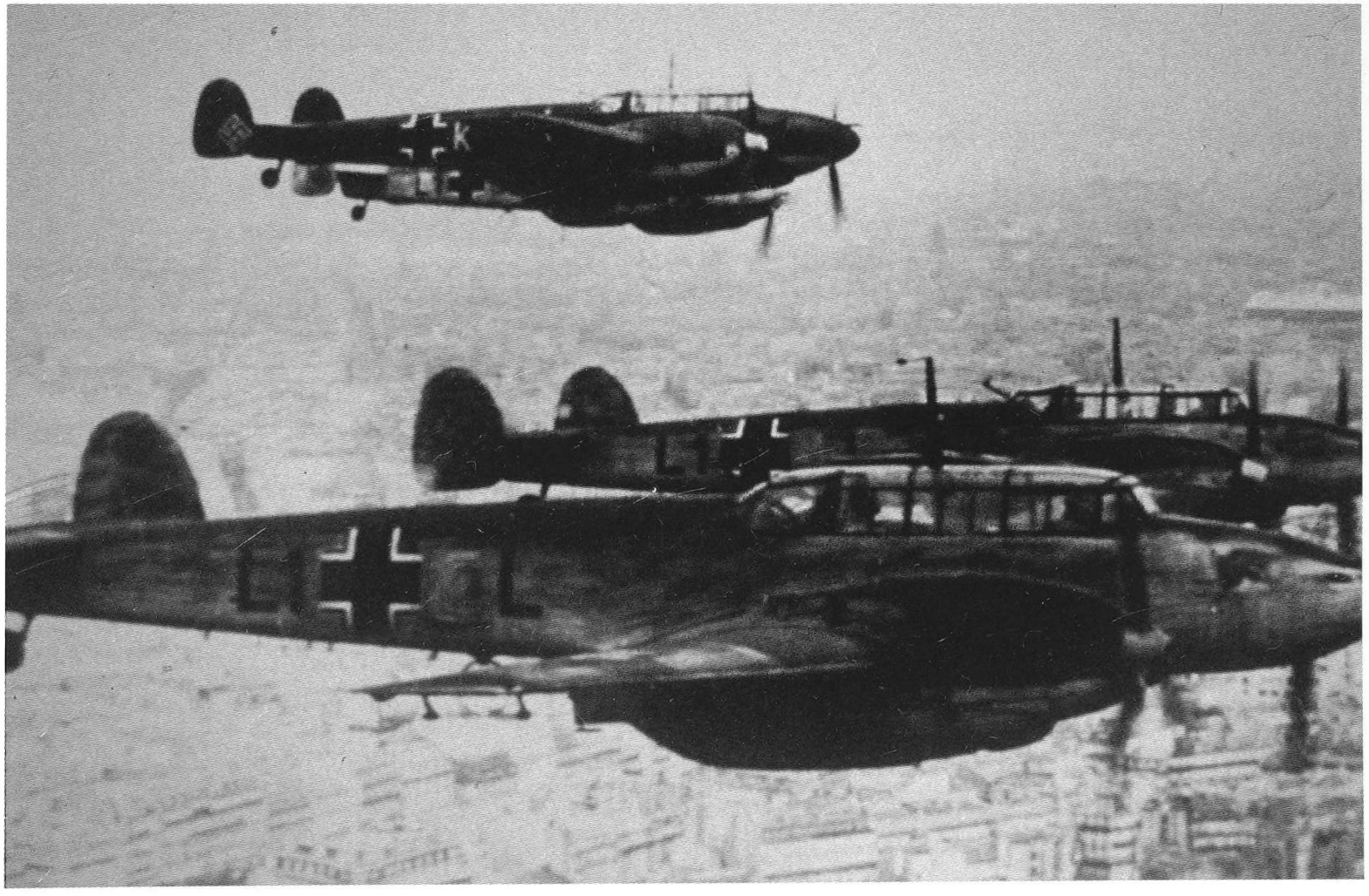
Post-1940 Operations

The severe rebuff handed out to the Bf 110 over southern England did not lead to its operational withdrawal. The burgeoning need for the Luftwaffe to build up a nocturnal defense force over the Nazi empire even as the Battle of Britain raged saw the design utilized in this manner. However, it was into early 1941 before an offensive role was again established, first with the creation of the *Afrikakorps* to reverse Mussolini's failed bid to drive the British out of North Africa, and then more comprehensively when Operation *Barbarossa* was launched in June against the Soviet Union. The relative weakness of the fighter strength and quality posed by the now-Allied nation at this stage of World War II permitted the *Zerstörer* crews to function in a confident manner, similar to that enjoyed up to mid-1940. However, this lease of basically unchallenged operational life during daylight would not last much beyond 1942, when the first of the contemporaneous Soviet designs such as the Yak-9 and La-5 appeared on the scene. Perhaps, fortunately for the Bf 110C but especially for its crews, the variant's frontline presence had by then already been greatly scaled down. (Having acknowledged this, the subsequent deployment of the E, F, and G series on daylight operations as late as 1944 would test their crews to and often beyond the limits of endurance!)

The neat lineup of three Bf 110Cs assigned to *ZG 26* is fronted by 3U+LR, a *7. Staffel* machine. The camouflage scheme, consisting of two-tone green top surfaces with light-blue undersides, would steadily give way to the top colors being restricted to the upper surfaces in favor of the underside color, over which mottling was applied. Tethering wires reach down from the outer wings to the ground. *III. Gruppe* was based at Barley in France during the Battle of Britain.

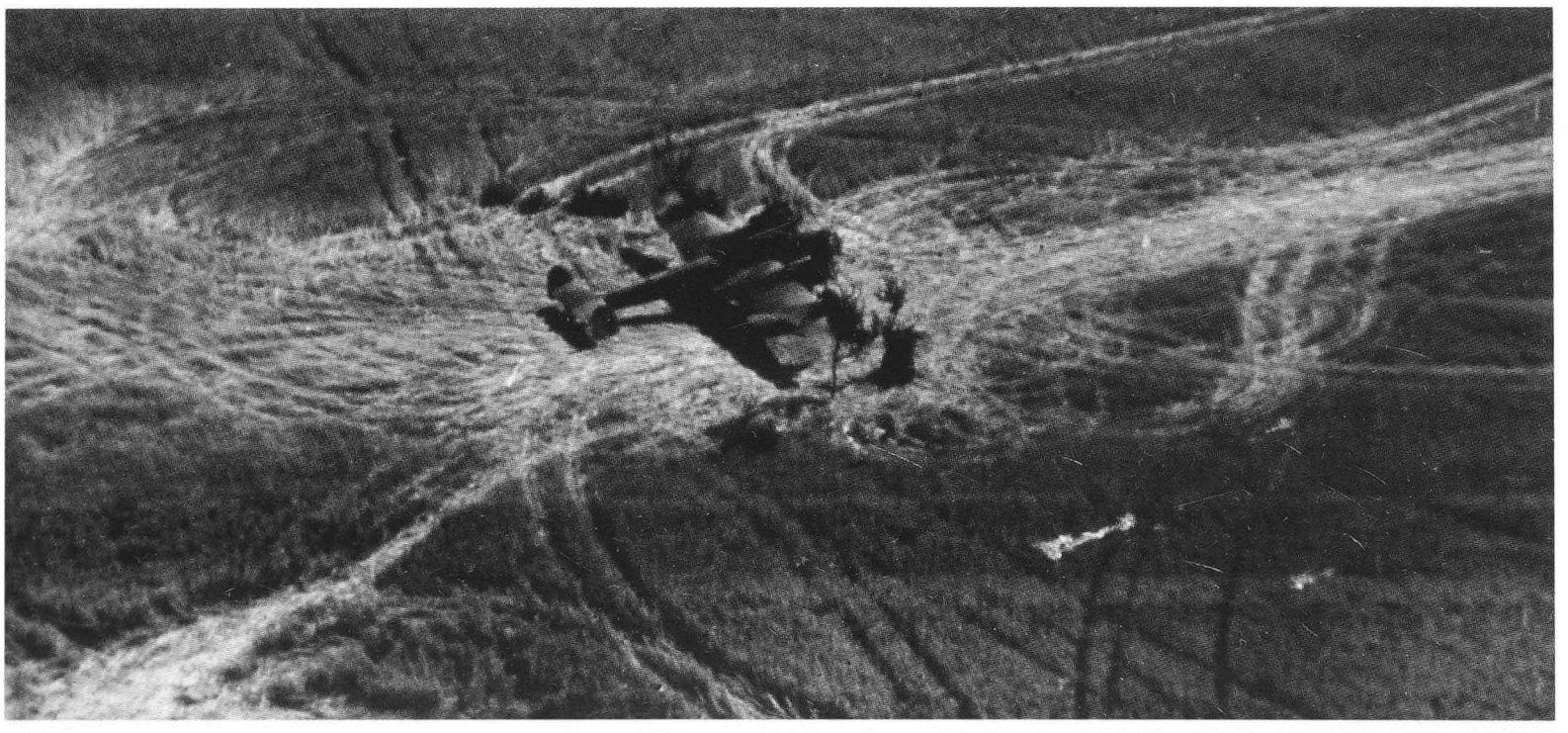


The surrender of France on June 22, 1940, is mere days distant from this shot of a formation of *3./LG 1* Bf 110C-2s traversing the city of Paris. The nearside *Rotte* (pair) have an unusual wash applied to the fuselage sides and *Balkenkreuz*, with the national marking bearing a very thin white outline. The aircraft third from the camera still bears the original two-tone green splinter camouflage, whereas the others have this color scheme limited to the upper fuselage surfaces.



Bf 110C-4 Specifications
(Two-Seat Fighter)

Dimensions
Length: 39 ft. 8½ in. (12.08 m)
Height: 11 ft. 6 in. (3.5 m)
Wing span: 53 ft. 47/8 in. (16.3 m)
Wing area: 413 sq. ft. (38.37 m2)
Power plant
Two 1,100 hp. Daimler-Benz DB601A; twelve-cylinder, inverted-V, liquid-cooled engines
Metal VDM three-blade, variable-pitch propellers
Armament
Four 7.92 mm MG17 machine guns in upper nose, with 1,000 rpg
Two 20 mm MG/FF cannon, with 180 rpg in lower nose
One 7.92 mm MG15, with 750 rounds in the rear cockpit
Weight
Normal loaded: 15,300 lbs.
Performance
Maximum speed: 349 mph at 22,965 ft.; 294 mph at sea level
Maximum cruising speed: 301 mph at 22,965 ft.; 263 mph at sea level.
Range on 279 gallons: 481 miles at sea level (262 mph)
Operational ceiling: 32,000 ft. (9,760 m)

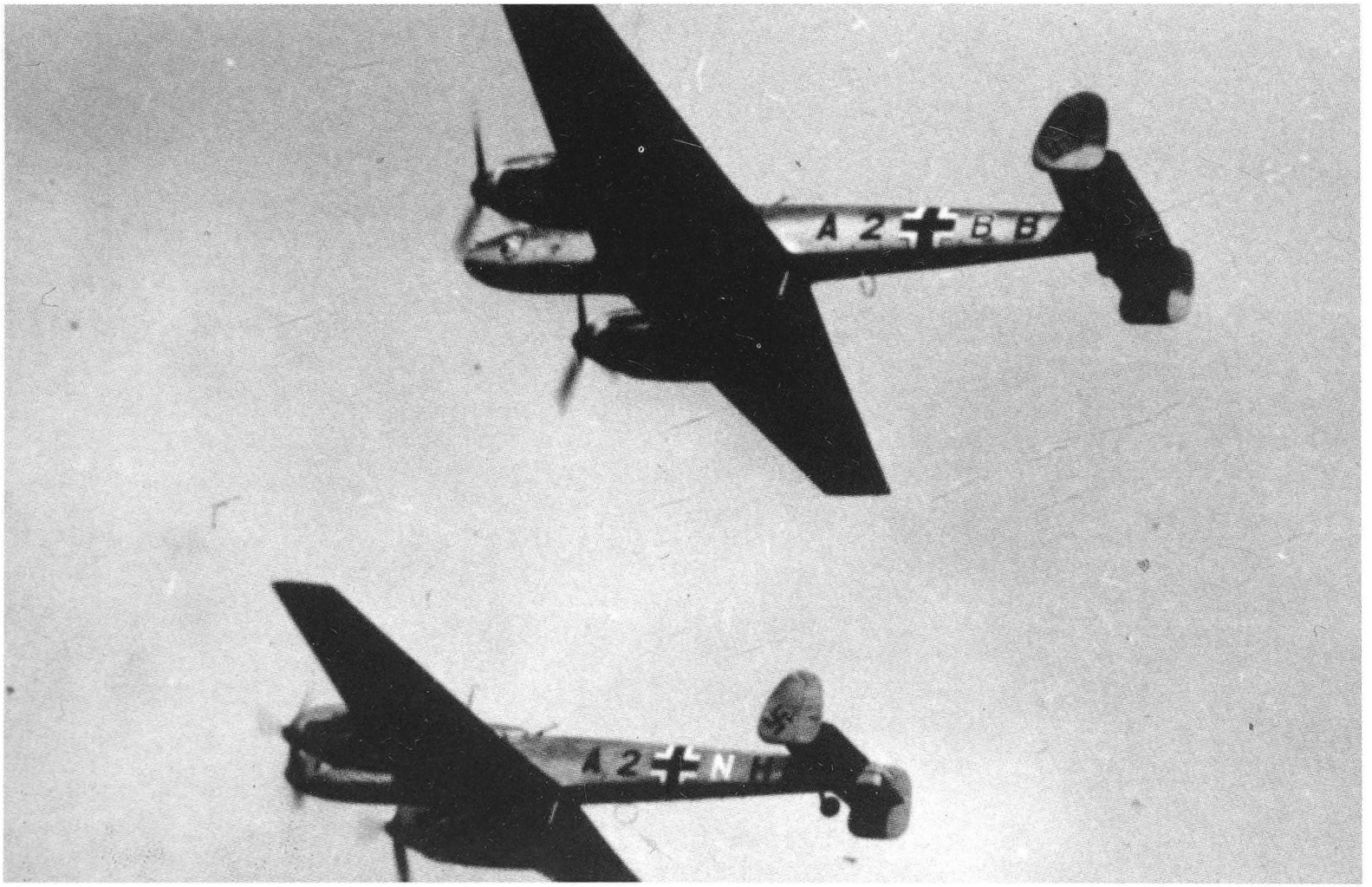


The primitive nature of many of the Luftwaffe airfields during the Battle of Britain is exemplified by the surroundings for a pair of widely dispersed Bf 110Cs. There are no signs of hangars or support structures, while the dispersal for the nearside fighter is nothing more than a flattened patch surrounded by what seems like long grass or reed. The dusty atmosphere would tend to play havoc with the engines and other refined equipment borne by the aircraft.

A ground crew member is engaged in attaching an SC250 bomb to the left-hand mounting on an ETC500 rack, an addition that was first introduced on the Bf 110C and D variants. The mobile lifting unit bears the official name of *Bombenheber* (bomb elevator) but was more colloquially known as the *Heuschrecke* (grasshopper). The SC250 was the heaviest missile that this mounting could accommodate.

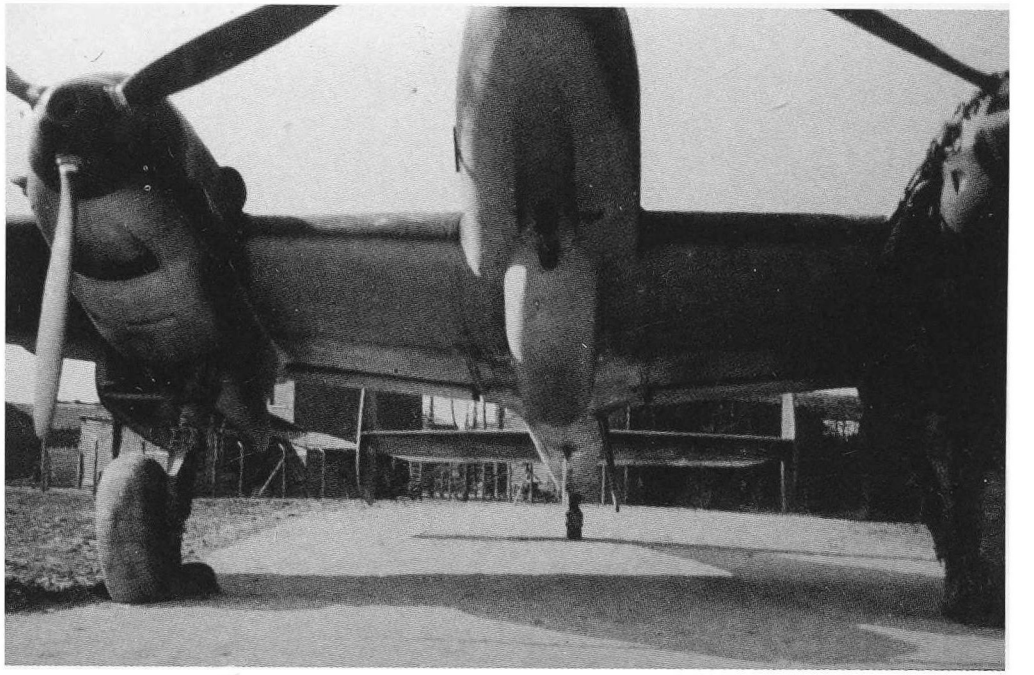
A group of airmen, several of whom wear the ribbon of the *Eisernekreuz* in their tunic folds, are studying maps. They are assigned to *3./ZG 2*—the Bf 110C behind being coded A2+AL—with the *Gruppe* currently stationed at Gayancourt in France. The time is July 1940, and the critical Battle of Britain is likely in its primary stage. Within weeks the confident predictions for the Bf 110's success against RAF Fighter Command will be tested and found seriously wanting, while some of these airmen will likely end up dead or, if more lucky, as POWs.

A grove of very tall trees form a basic camouflage shield for a Bf 110C assigned to *ZG 2* as a companion aircraft makes its final landing approach off what is probably its latest sortie, which was flown and thankfully survived in the face of ever-stiffer RAF Fighter Command opposition. The attention of the airman (*foreground*) and his fellow personnel (*far left*) is focused on some other matter.



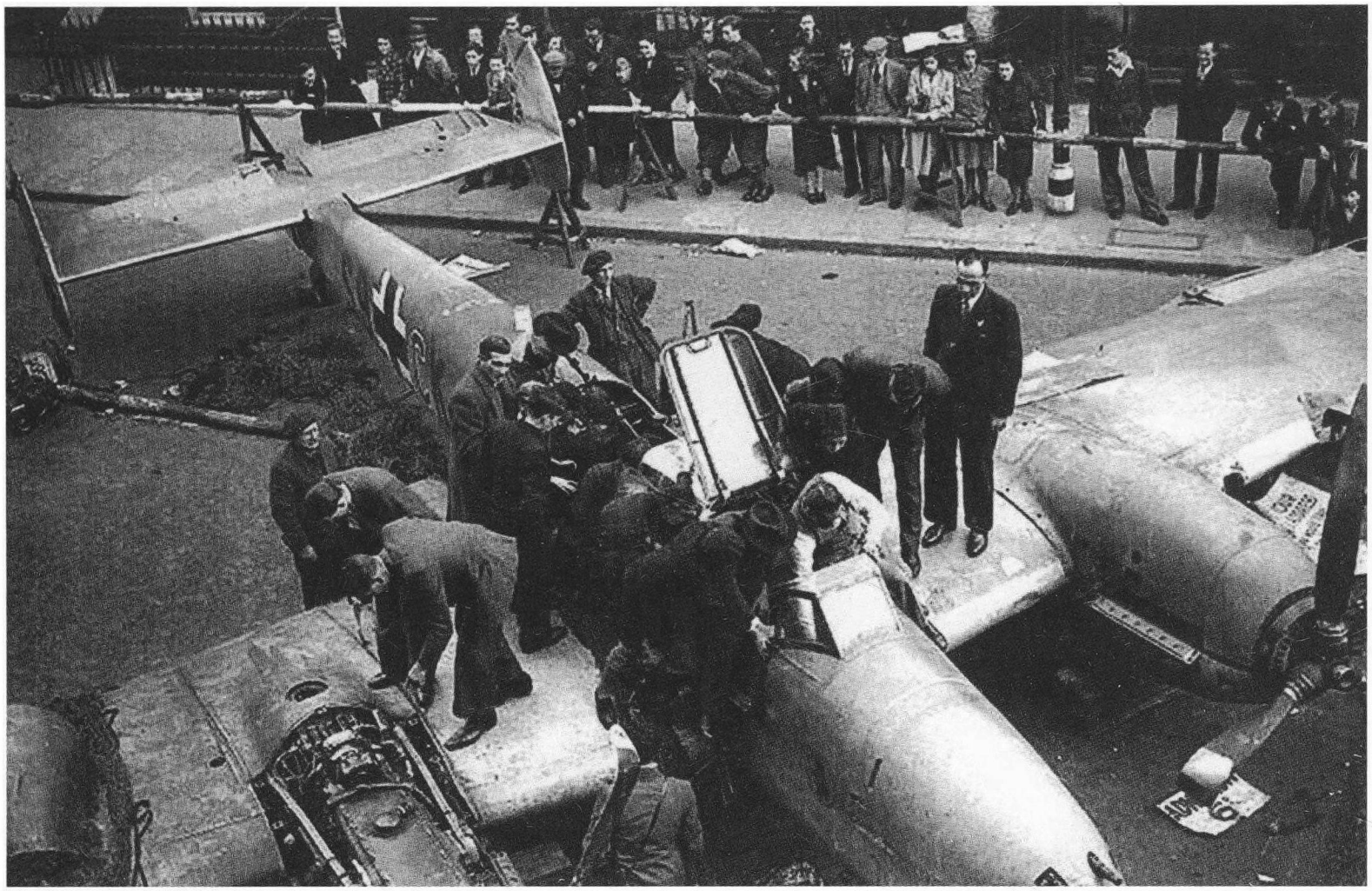
A *Rotte* of Bf 110Cs assigned to *I./ ZG 26* are holding a fairly tight formation. The nearside *Zerstörer* bears the *Stab/I.* letter B with its companion a *1. Staffel* machine. The basic tactic of a Bf 110 formation when challenged was to form a circle; in theory this prevented attackers from gaining an unfettered firing pass without risking counterfire from the aircraft directly behind the one under assault.

Hptm. Walter Ruebensdoerffer was the original *Kommandeur* of *Epr.Gr. 210*. He led the unit in an initial series of well-planned and delivered assaults on radar installations, airfields, and other support installations up to August 15, 1940. On that day, Croydon airfield was attacked instead of Kenley; RAF fighters decimated the *Gruppe* formation, with Rubensdoerffer and his Bf 110D/S9+AB becoming one of the fatal casualties.

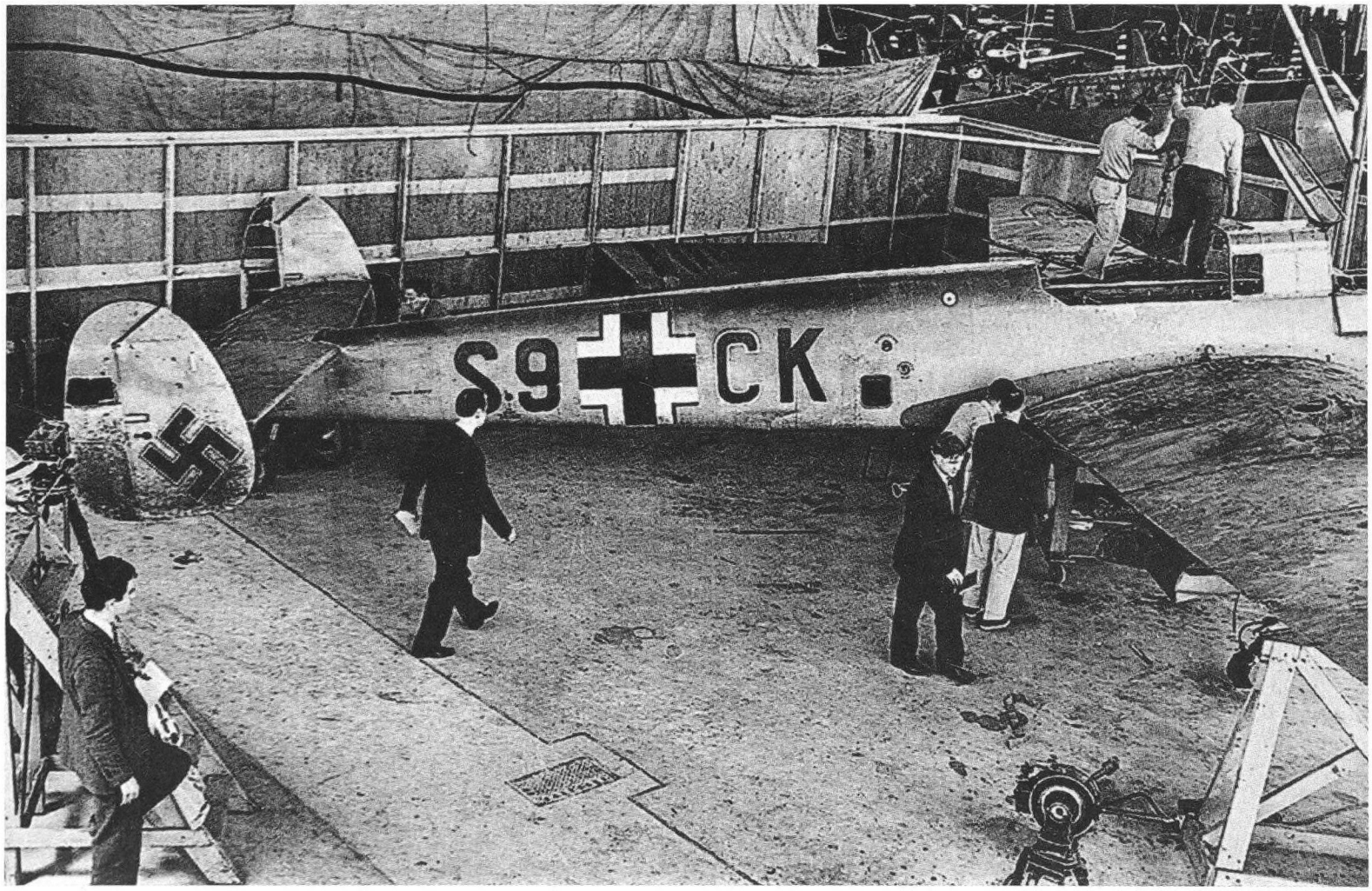


The specialist unit *Erprobungsgruppe* (experimental force) *210* was specifically allocated the duty of launching pinpoint attacks against key targets such as radar stations during the Battle of Britain. The 30 mm cannon, whose ventral location required the detaching of the standard pair of 151/20 cannon, was applied to the Bf 110C-6, and *Epr.Gr. 210* was the sole operator of this *Zerstörer* variant.

Fw. Ebner sits astride an SC500 bomb, while behind him is S9+DK, a *2./Epr. Gr. 210* Bf 110. The subunit along with *1. Staffel* operated on the Messerschmitt twin engine, while *3. Staffel* flew Bf 109s. Ebner and his gunner were more fortunate than many of their colleagues involved in the battle; they were shot down in this aircraft on September 27, but both survived as POWs—unlike three other *Gruppe* crews, including that of *Hptm.* Lutz (*Kommandeur*), who all perished.

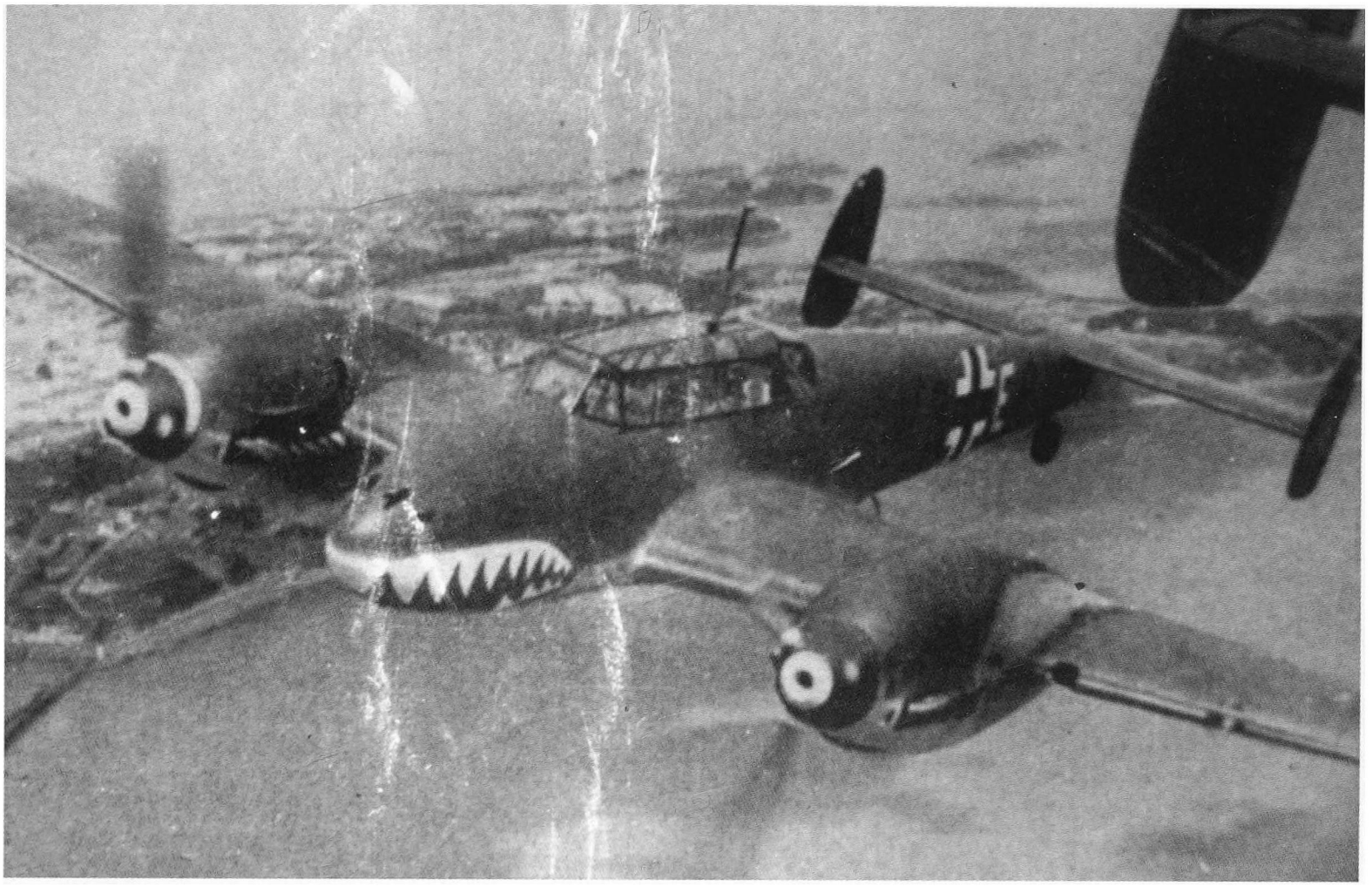


The casualty rate among the ranks of the specialist unit *Epr.Gr. 210* was high throughout the summer battles of 1940 over southern England. Not all of the crews were as fortunate as the duo flying in this *2. Staffel* Bf 110C, whose pilot brought off a successful crash landing. The aircraft is seen under intensive inspection while on public display in central London.



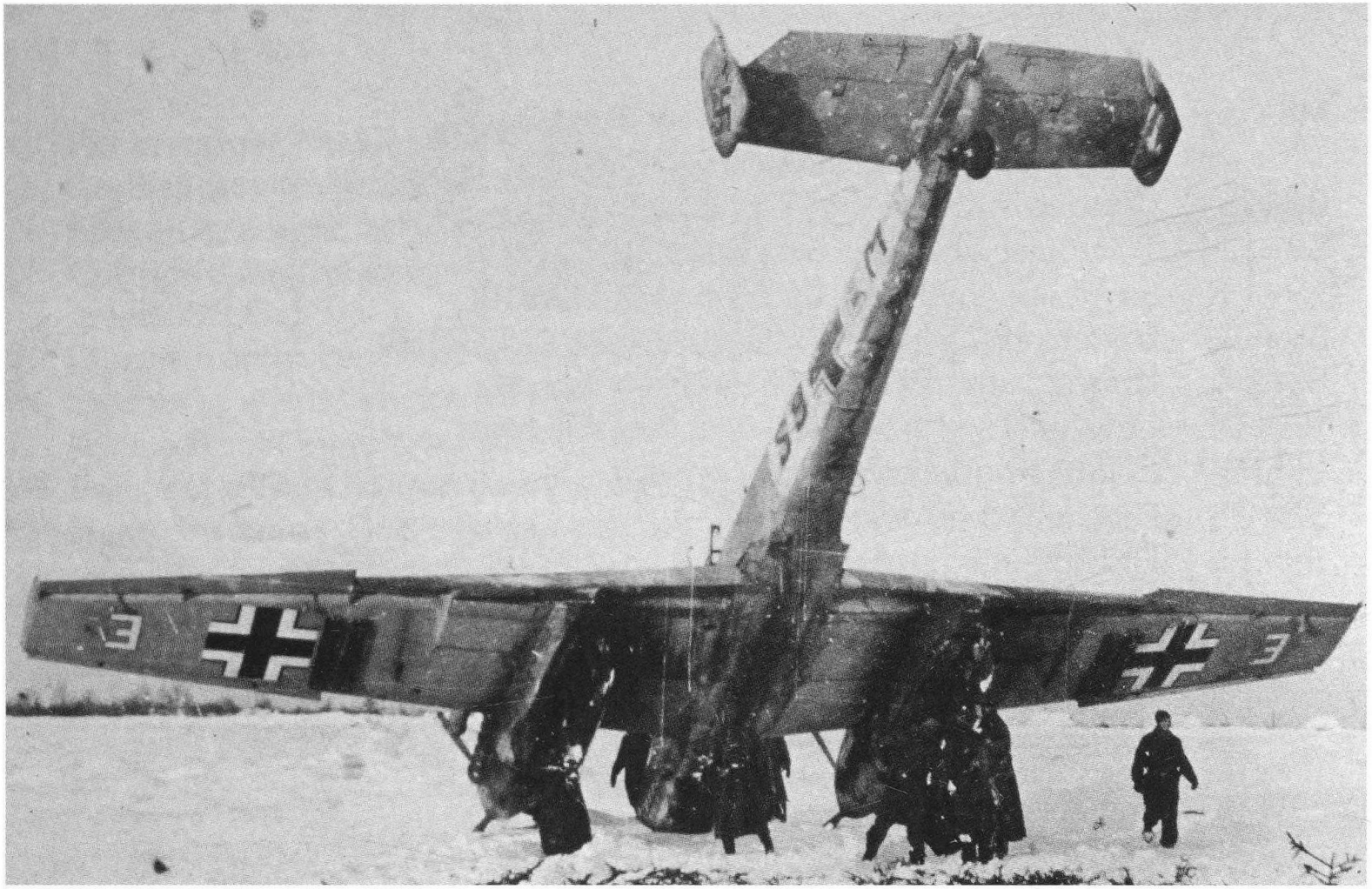
The same Bf 110C is photographed after shipment to the United States, a fact confirmed by the USAAF trainer aircraft seen in the background, which is clearly a Vultee design, this being the company that carried out a full evaluation of the aircraft. The rudder fabric has been stripped off the port rudder, but the airframe is still in relatively intact condition.

The creased surface of the picture scarcely diminishes the distinctive outline of a *ZG 76* Bf 110C as the *Geschwader* flies operations during the Battle of Britain. The caption states that the unit is flying over the English Channel; the medium altitude rather suggests that the coastline is on the French side, because, if not, then the chances of the formation being bounced by the RAF fighters ran quite high.

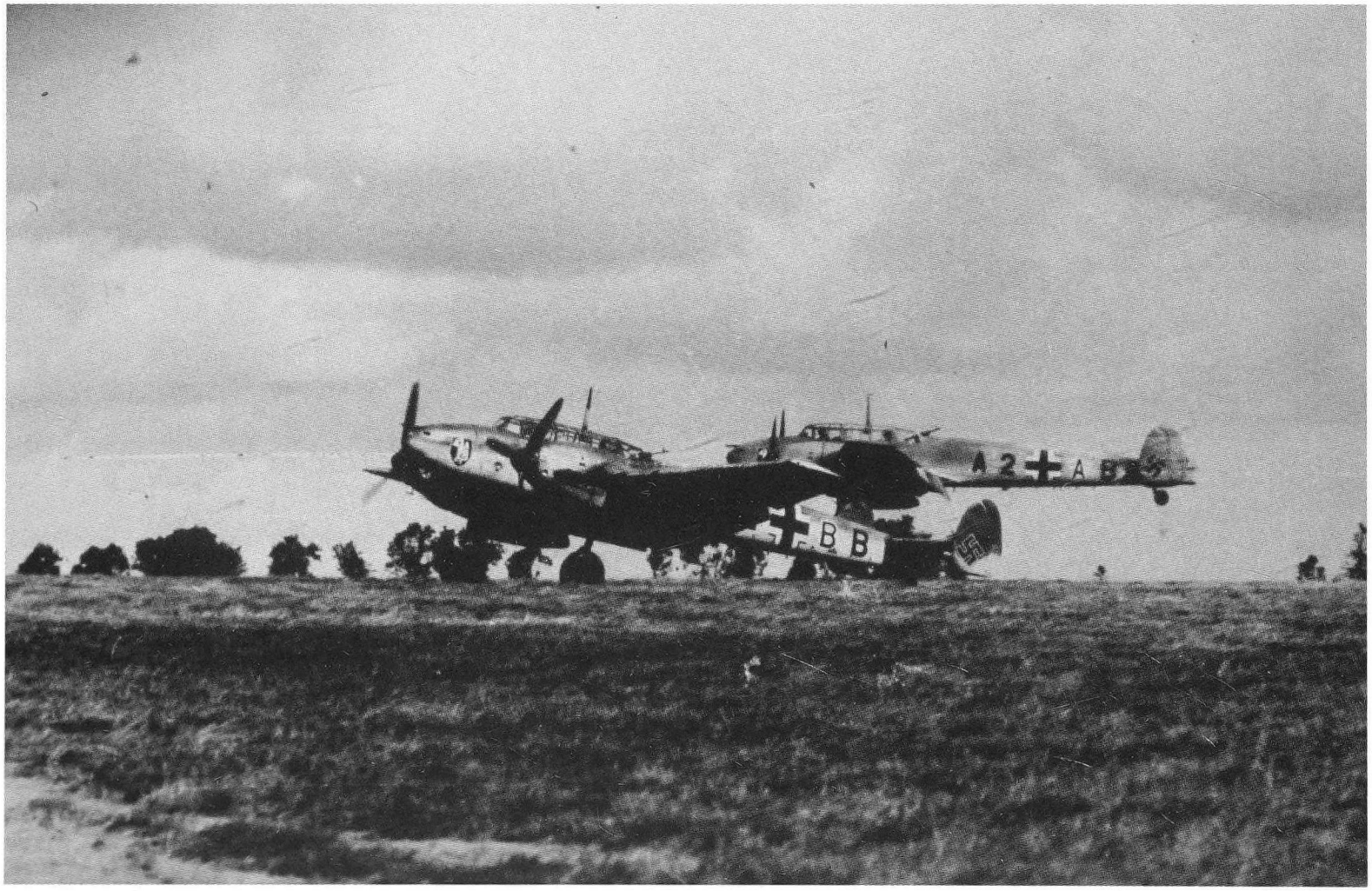


The ranks of *ZG 2* and *ZG 26* were shorn of seven Bf 110Cs on September 3, 1940, the executioners being Hurricanes from Nos. 17 and 46 Sqdns. The soldiers are bearing away a complete starboard fin and rudder from one of these victims, which reportedly came down in Essex according to the newspaper account accompanying the picture; however, it is not clear which crash site and therefore from which Bf 110 the unit was extracted.

Oblt. Gerhard Granz (*left*) is engaging in an animated conversation with his gunner, *Fw.* Willi Schutel, both assigned to *I./ZG 2*. The Bf 110 in the background, C-4/3M+BB, appears to be a *Stab I.* machine, judging by the dark letter *B*. Both airmen's tenure of freedom ended abruptly during the first major strike on London (September 7); on that day they abandoned the aforementioned aircraft over Essex and floated down into captivity.



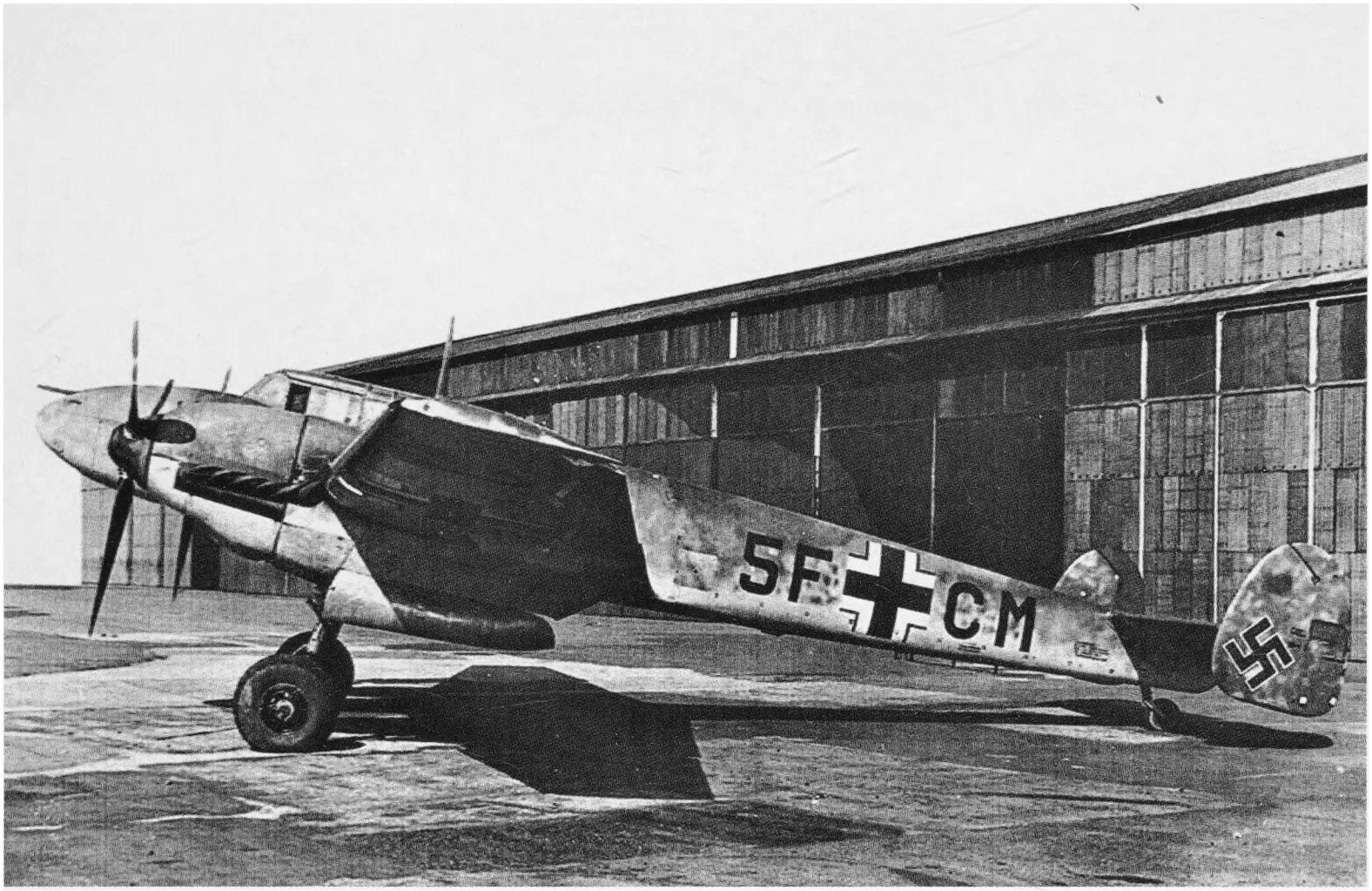
A Bf 110 believed to be serving with *SKG 210*, having overshot the runway, has performed the dreaded *Kopfstand* (headstand); the "mal-action" was caused either by the treacherous runway surface or brake failure. The underwing surfaces bear twin racks or grids (*Roeste*), on which were mounted SD2 antipersonnel bombs. The Luftwaffe sprayed aircraft with a whitewash during the winter months as a camouflage measure This unit's title was changed to *ZG 1* during 1942.



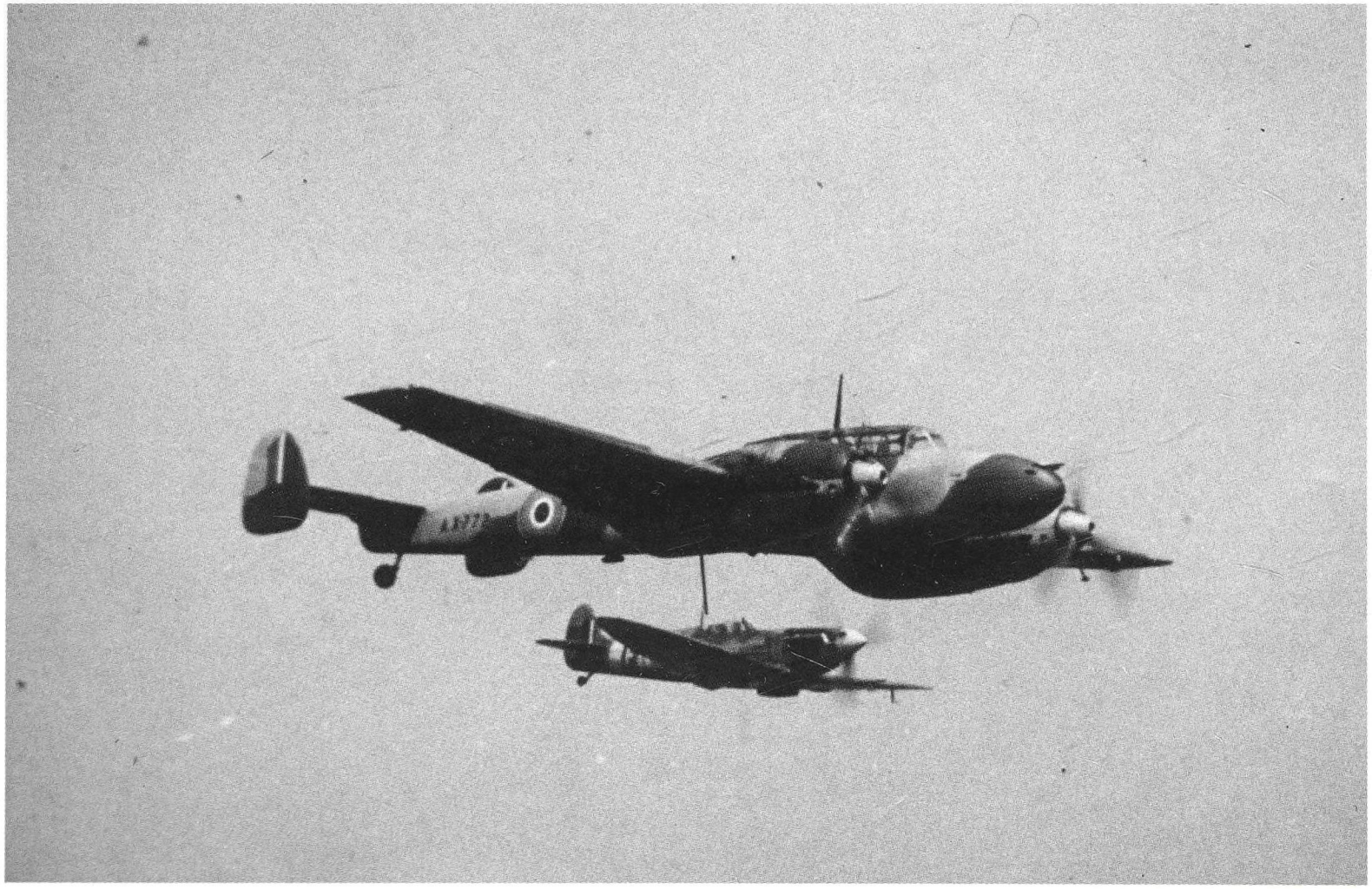
A Bf 110C belonging to what is actually *Stab II./ZG 2* is seen taxiing across the undulating grass surface of what is their airfield in France, as a second *Stab I.* aircraft flares out for what will be a bumpy experience. The *I.* and *II. Gruppe* elements of the *Geschwader* served within *Luftflotte 3*, but increasingly severe attrition finally forced their withdrawal from operational duties during September 1940.

The original twin-tone green camouflage applied to the fuselage on the Bf 110 was gradually diminished in scale. By the Battle of Britain the separation line had been raised to the top of the spine, as seen in this view of a *II./ZG 2* machine based at Guyancourt. Cover over the *Balkenkreuz* is probably intended as a camouflage measure against RAF fighter strafing, although such activity was highly unlikely at this stage of the battle.

The *I. Gruppe* markings on a Bf 110C about to lift off from the bumpy airfield surface illustrate the sometimes confusing Luftwaffe insignia code system, which also seems to contradict the previous two captions. What is now *II./ZG 2* was formerly designated *I./ZG 52*, but its aircraft still bear the A2 *Gruppe* letters assigned the latter-named subunit. The subsequent code change will be to 3M.



The code letters applied to what is a Bf 110C-5 (5F+CM) denote its assignment to *4./*(F)*Aufklärungs Gruppe 14*. The unit is tasked with reconnaissance operations, and the (F) stands for *Fern* or long range. The forced landing at Goodwood on July 21, 1940, following fighter-inflicted damage, saw *Oblt.* Runde and *Fw.* Baden ending their World War II flying careers—but not so their charge.

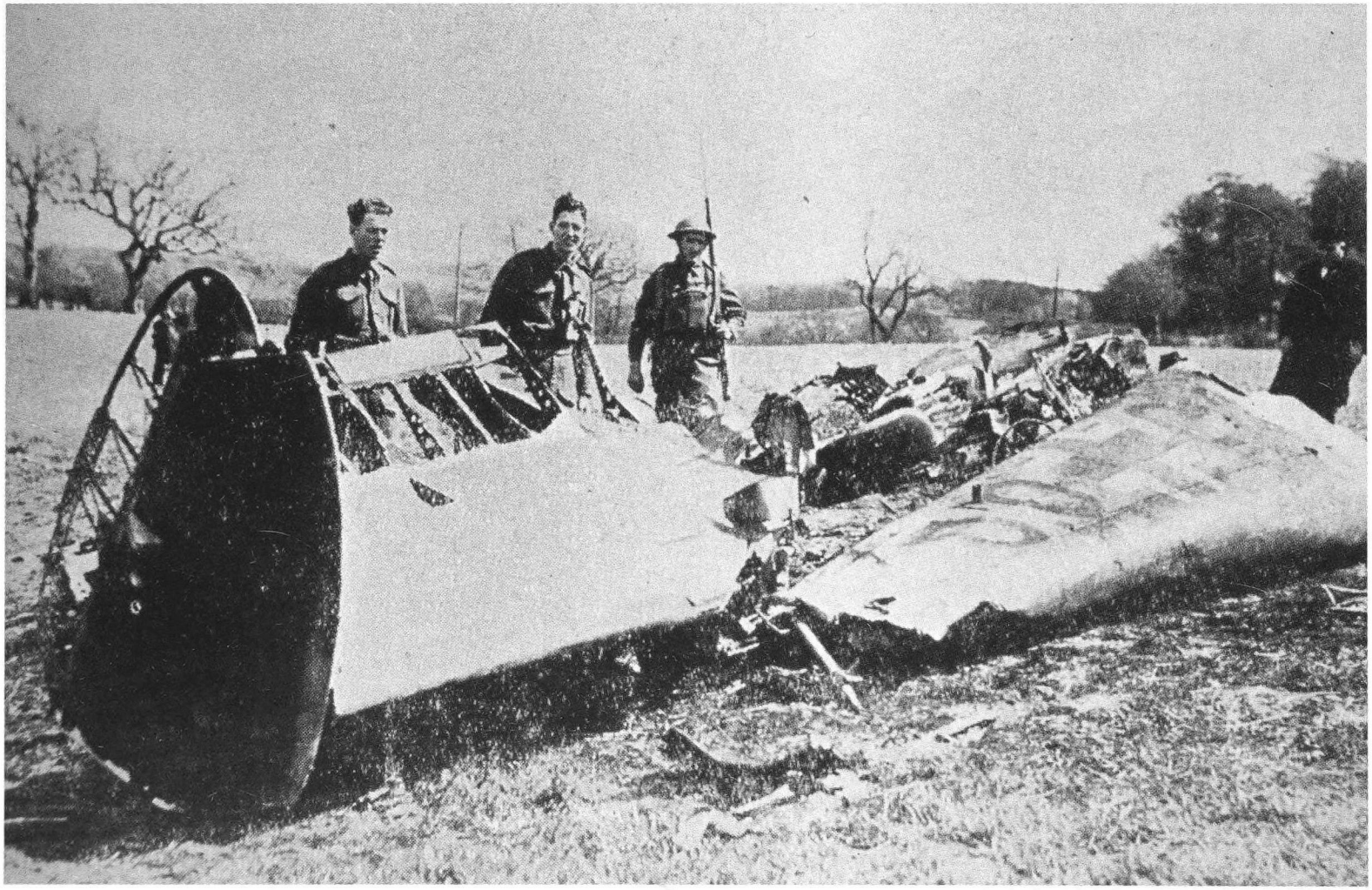


Runde's aircraft was sufficiently intact to merit its resurrection to airworthy condition. It is seen bearing RAF markings and serial number following assignment to 1426 (enemy aircraft) Flight, also known as the "RAFWAFFE." In common with other captured airworthy machines, it was used in orientation lessons for Allied aircrew. The Spitfire is a necessary escort that indicates the Bf 110s' "friendly" status to pilots unaware of this fact, and likely to initiate an attack on the apparent hostile.

The French airfield of Yvrench was where *I./ZG 26* was based under the command of *Hptm.* Makrocki during the summer of 1940. The distinctive white nose panels favored as a unit identifier are well weathered, demonstrating the aircraft's regular operational use—as well as their relative good fortune in surviving the pitched air battles over southern England, which had proved so lethal for so many of their fellow machines along with their crews.

II./ZG 2 was redesignated *I./ZG 52* in early 1940 and saw extensive action during the French Campaign before a title change back to its original one. It was withdrawn from operations over Britain to prevent total annihilation. In this picture, the heavy camouflage borne by A2+GL (*left*) contrasts with the lighter-applied schemes borne by A2+CL, both Bf 110C-4s. The two *Zerstörers* in the center background are D variants.

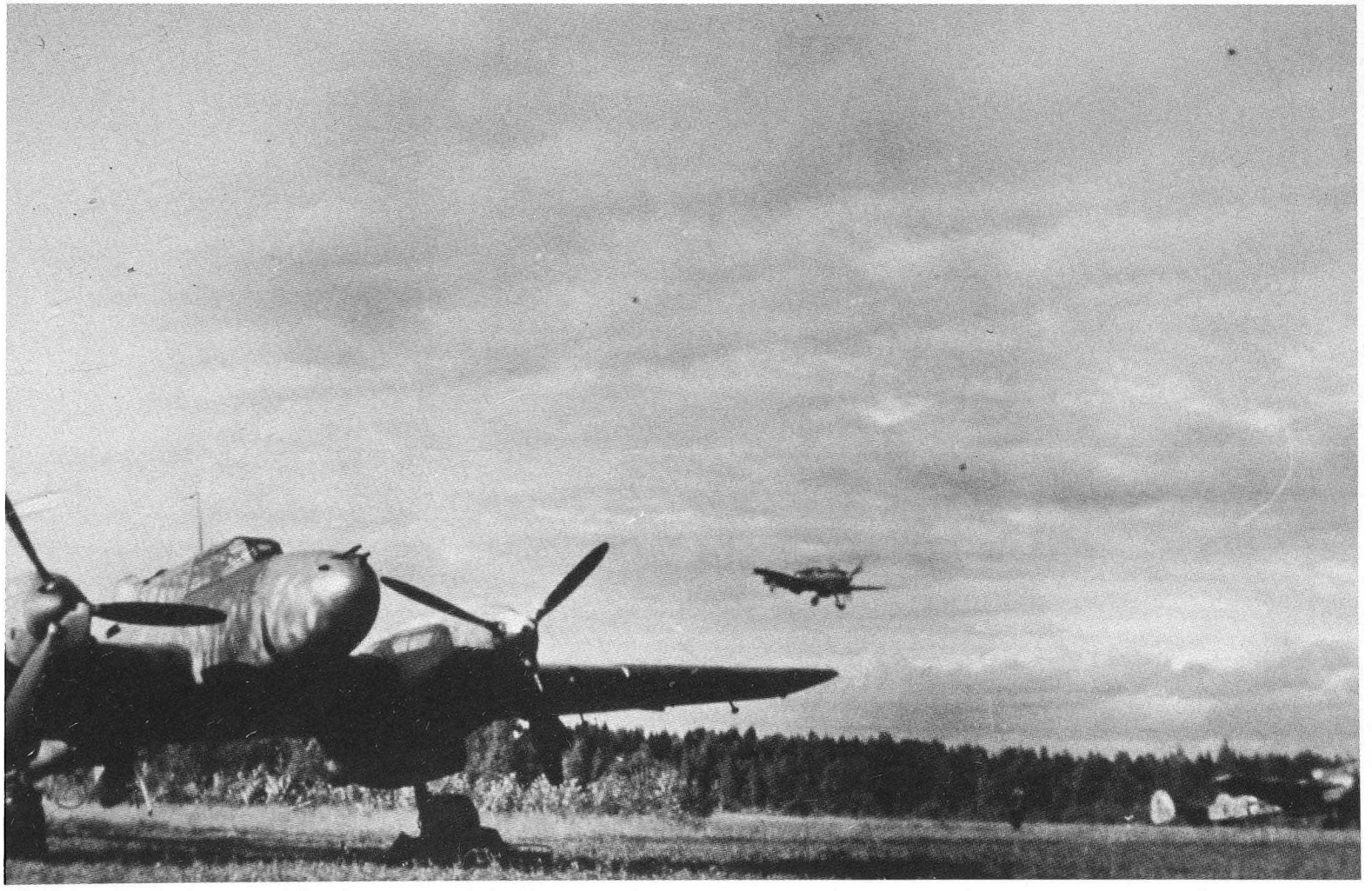
Lehrgeschwader (*LG*) *1* operated a mix of single- and twin-engine aircraft designs that included the Bf 110. The *Zerstörer* element was reportedly assigned to *V. Gruppe*, but the letter "B" ahead of the *Balkenkreuz* on this Bf 110C indicates a *I. Gruppe* assignment. The twin aerial wires extending back from the radio mast were reduced on later airframes to a single example attached to the starboard fin tip.



Rudolf Hess, the Nazi deputy *Führer* to Hitler, made an epic flight from southern Germany on May 10–11, 1941, that culminated with his bailing out over Bonnyton Moor in Scotland. The shattered starboard tail and rear fuselage section bearing factory codes are under guard. The latter can be seen to this day as part of the Imperial War Museum's collection of military material held at Lambeth in London.

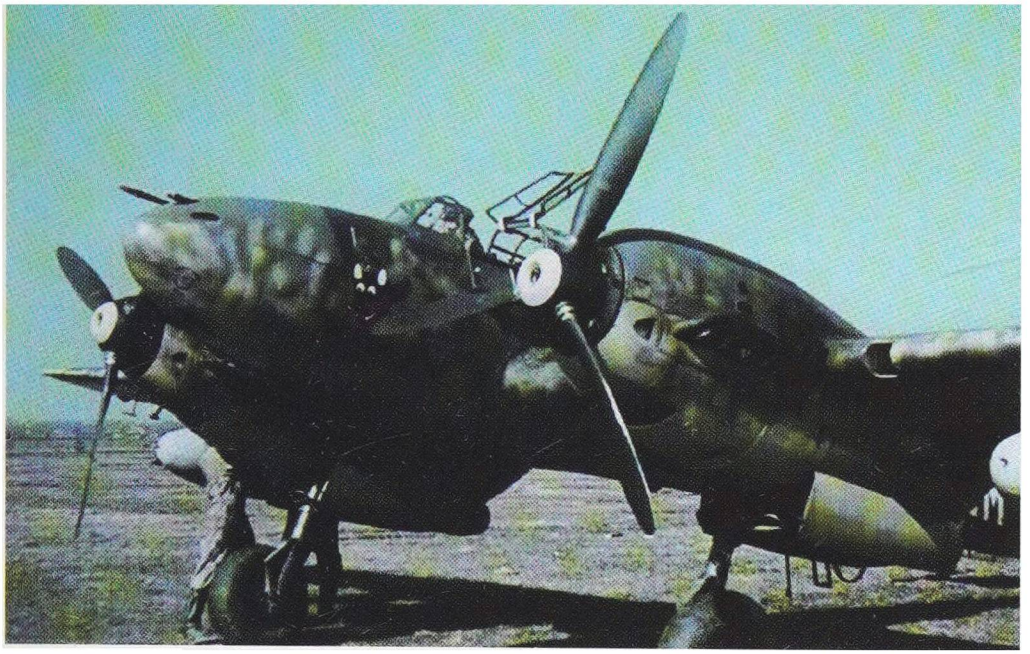
This rudimentary airstrip somewhere in Russia is flanked by a line of conifers and is currently home for a Ju 87 unit, in this instance *StG. 1*, as confirmed by the A5 codes on the duo of Bf 110s. The *Zerstörer* aircraft bear the letter "B" to indicate their *Stab I.* status and are probably assigned for senior staff use. Picture was taken in the summer or autumn of 1941. The crated bomb in the foreground is either an SC250 or SC500 weapon.

A Bf 109E is about to complete its landing approach to a Russian airfield that is the base both for it and the pair of Bf 110s squatting on the rough grass surface. The photograph was taken during the autumn of 1941, when the true extent of Soviet resistance to Operation *Barbarossa* as well as the vast expanses of Russia, with its minimal road and rail communications system, was beginning to tell upon the German military.

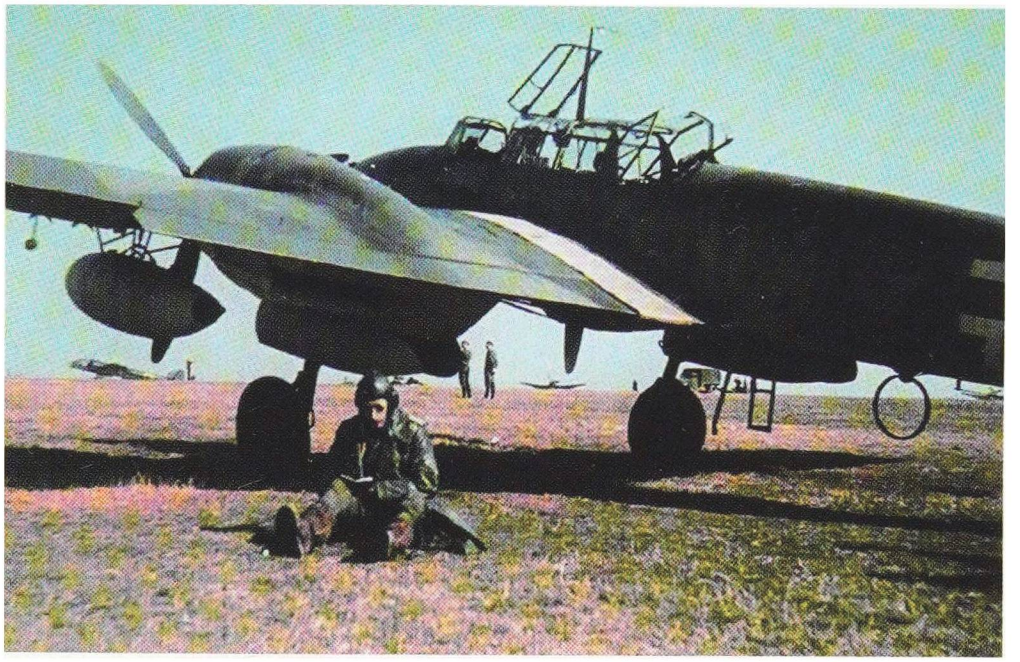


The current absence of a hoisting frame with which to easily detach the starboard propeller on a Bf 110 of *ZG 26* requires the concerted effort of several mechanics to safely lower the unit along with the backplate, which weighs in at over 400 pounds (181 kg). Airman at top right momentarily takes a break from maintaining the battery of nose-mounted machine guns as he watches his colleagues' effort. The diamond shape containing a ladybird applied on the nose is the *III./Gruppe* insignia.

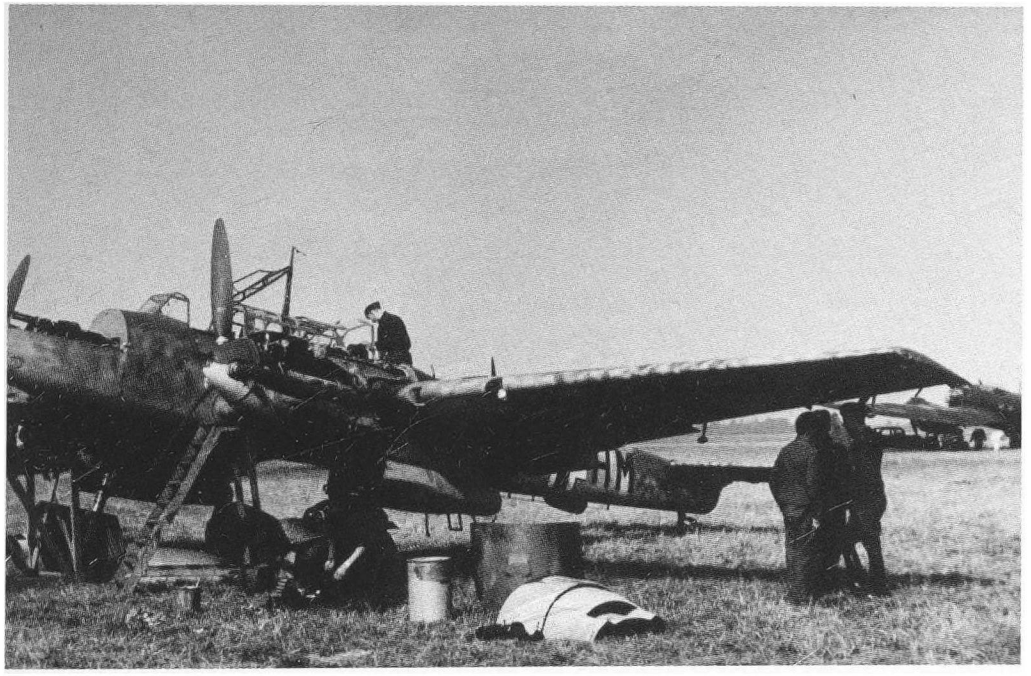
A close-up of the port main landing gear on a Bf 110 displays the outward mounting of the wheel, the V-pattern antitorque frame mounted ahead of the support strut, and the distinctive lateral rib pattern that was a feature of most Luftwaffe wheel covers. The fighter, based at Athens-Kalamaki in preparation for the invasion of Crete in late May 1941, has the oil cooler intake panel detached.



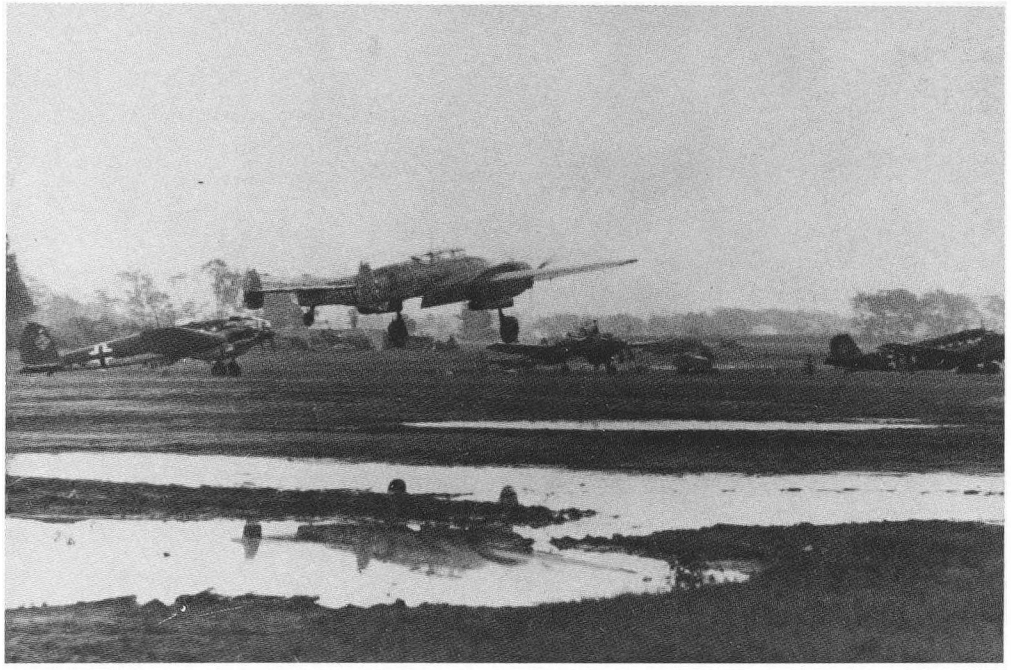
A *Teufelkopf* (devils's head) adorns the nose compartment on what is a heavily camouflaged Bf 110C-5 coded L2+MR and serving with *7./LG 2*. This variant was a reconnaissance aircraft that dispensed with the lower-fuselage MG/FF armament. The external wing tanks appear to be of the larger-capacity 900-liter variety.



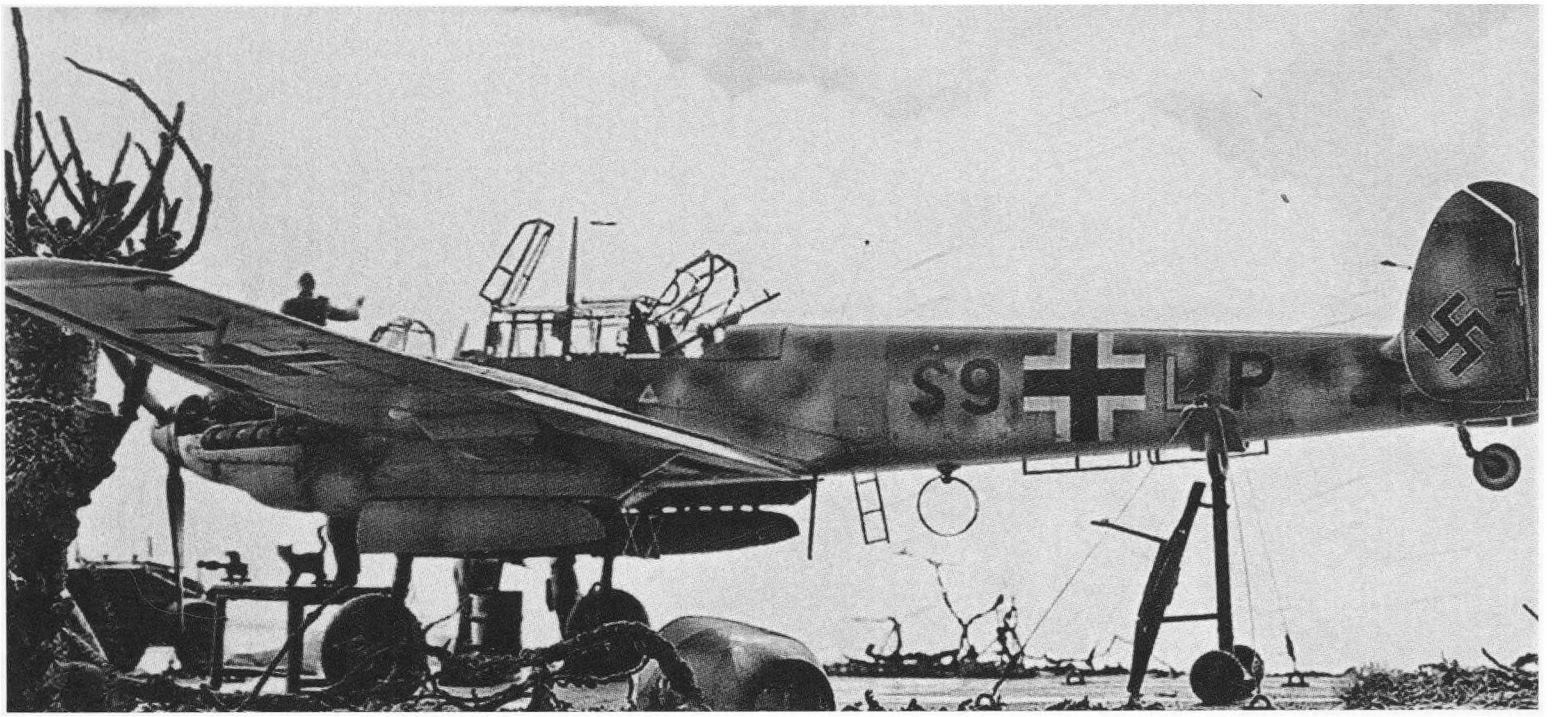
The ever-sparse geography of what appears to be Soviet Russia forms the backdrop for a Bf 110C-5 of *7./(H)LG 2*, the "H" referring to the unit's attachment to the Wehrmacht. The 300-liter external tanks would provide the necessary range extension to enable the comprehensive confirmation of, for example, any noticeable concentration of enemy forces. In the background is what appears to be a Do 17P (*left*) along with a Ju 87 (*center*). The crew member appears to be happily immersed in his book as he awaits a call to action.



The Bf 110C-4 was a development of the C-2 with an improved version of the MG/FF cannon, as well as benefiting from armor provision for the crew. This example belongs to the *4. Staffel* of an unknown *Gruppe*; the port engine is under detailed examination, while the machine guns are exposed with the detaching of the upper nose panel. Note how the heavy mottle is carried over onto the wing leading edges. Spinner covers bear two color segments.



A Bf 110 has flared out and the pilot is on the point of landing his charge on what is a rather waterlogged airfield surface. The camouflage pattern on the He 111 (*left*) is one that was being abandoned as World War II commenced, but this still provides little indication of when and where the photograph was snapped.

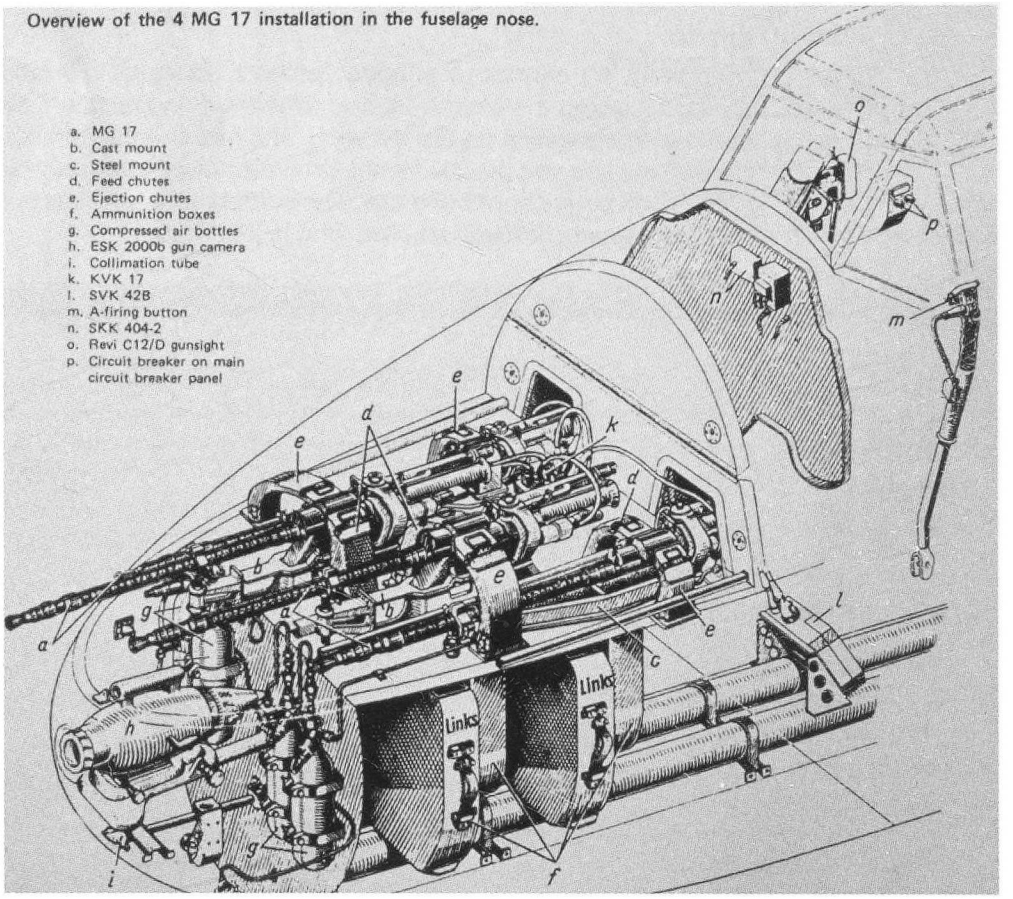


The horizontal configuration of what is stated to be a Bf 110C serving with *Epr.Gr. 210* is necessary in order for the aircraft to have its nose-mounted weapons correctly orientated. The color band applied almost directly behind the gunner's canopy is probably yellow in accordance with units stationed on the Russian Front. The C series began to be withdrawn from frontline service following production cessation in spring 1941.

An RAF pilot is adjusting his parachute harness preparatory to boarding what is probably a Gladiator biplane fighter. In the background lies an abandoned, tailless Bf 110 that sports a shark mouth design. The fighter served with the *II./ZG 76* detachment, which was involved in the short-lived Iraqi Campaign occurring in the summer of 1941.

Overview of the 4 MG 17 installation in the fuselage nose.

a. MG 17
b. Cast mount
c. Steel mount
d. Feed chutes
e. Ejection chutes
f. Ammunition boxes
g. Compressed air bottles
h. ESK 2000b gun camera
i. Collimation tube
k. KVK 17
l. SVK 428
m. A-firing button
n. SKK 404-2
o. Revi C12/D gunsight
p. Circuit breaker on main circuit breaker panel



The battery of four MG17 machine guns with a 7.92 mm caliber was introduced on the Bf 110C and continued in general service although it was replaced by cannon-caliber weapons in specific instances toward the end of World War II. The guns were mounted on a platform, with the ammunition boxes in pairs beneath. The individual guns were staggered laterally in a left-hand *Schwarm* manner as well as in a vertical arc, as seen in this diagram.

Ditching an aircraft of any size or type is ever unpredictable as regards a successful outcome. The pilot of this Bf 110 has accomplished the feat, but he and the radio operator have to get clear and inflate the dinghy as quickly as possible; the high tail angle could easily develop into the aircraft descending swiftly into the depths, taking its occupants with it. This picture was reportedly taken during the Battle of Britain, but the shadowy image conceals the precise *Gruppe* to which the *Zerstörer* belongs.

CHAPTER 4

Early Night Fighters

"Night fighting? It will never come to that!" was reportedly uttered by Hermann Göring during the initial stages of World War II—a not-unsupportable statement as Germany rolled through Europe and by June 1940, was left with just Britain to conquer before the war in the west was successfully concluded. Ironically, it was Bomber Command's enforced switch from daylight to nocturnal operations from May 1940 onward that was the catalyst for a similar switch to combating its incursions over the Third Reich; in truth, the subject had been mooted three years earlier but with potential measures limited to orbiting areas that were searchlight lit.

The initial aircraft allocation consisted of *IV./JG 1*'s Bf 109s, a measure that smacked of expediency. A more sensible if still-basic measure was the redeployment of *I./ZG 1* to the function in June, along with *IV./JG 1*, whose Bf 109s gave way to the Bf 110; the combined unit was renamed *I./NJG 1*, and the initial step in creating a comprehensive *Nachtjagd* force was duly taken. *Hptm.* Wolfgang Falck was appointed *Kommodore*, a post he would hold for three years; within a short time, *II.* and *III./NJG 1* were established and Dutch airfields were occupied; the fledgling *NJG 2* was similarly based in Holland, and all four *Gruppen*—later six with *I./NJG 2* and *NJG 3*'s involvement by the year's end, the latter based farther east at Vechta—were steadily and successfully challenging the RAF bombers' progress

The current lack of airborne radar sets did not totally inhibit the *Nachtjagd* crews' ability to seek out their prey. The concept of a bomber stream with which to swamp the defensive system was almost two years away, and the policy of aircraft flying individual courses worked at least marginally in their adversaries' favor. There were two ground/air variations in engaging the bombers, both bearing abbreviated titles.

The initial one was *helle Nachtjagd,* shortened to *Henaja*, which relied on a target being searchlight illuminated in the Bf 110's vicinity; priority to engage a bomber was given to the crew over that of the flak batteries aligned with the searchlight units. The limitations placed on the night fighters lay not only in respect of their still-minimal strength in numbers but ironically also with the widespread geographic approach of the RAF raiders to their targets.

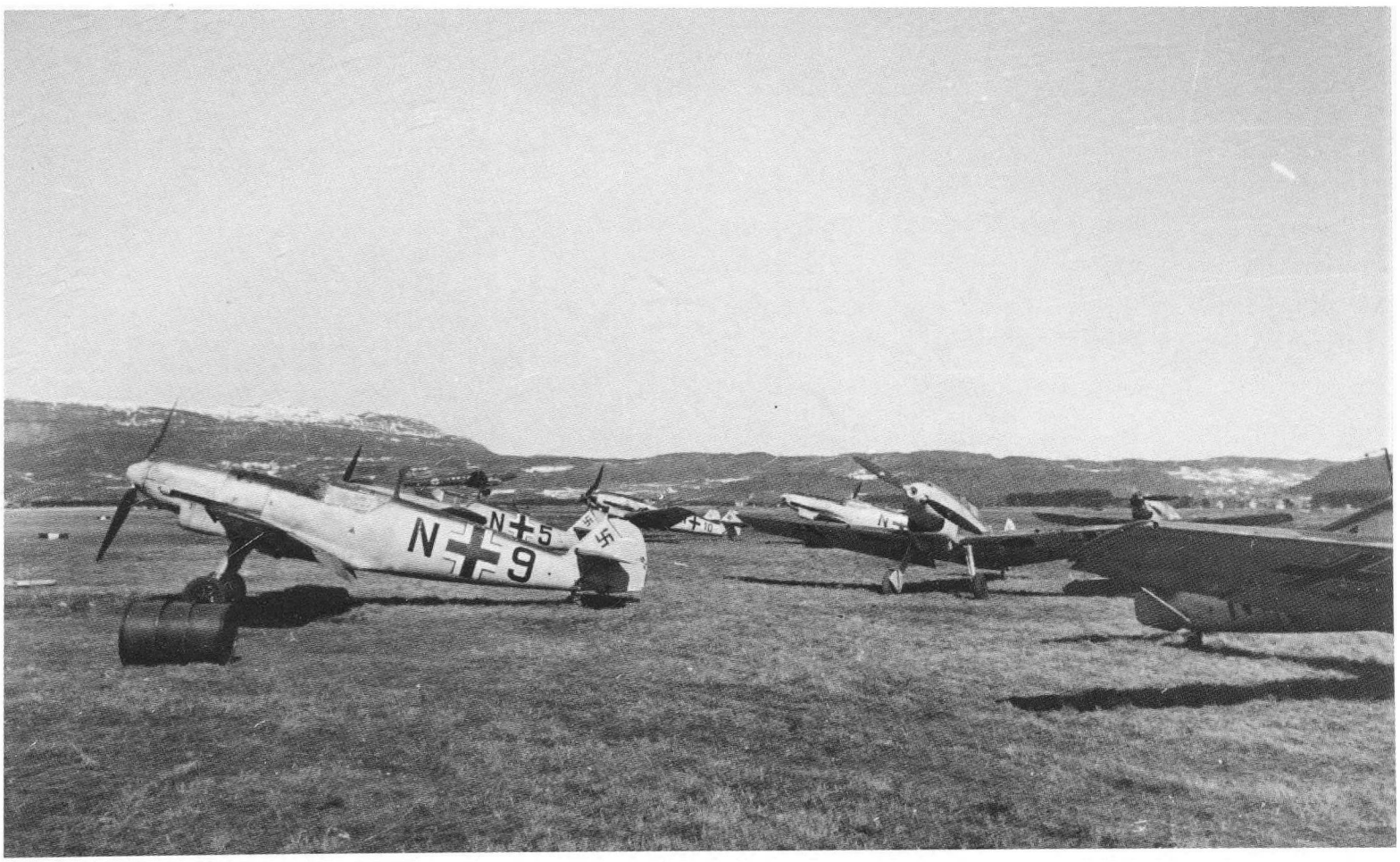
The creation of a *Nachtjagd* Division under *Gen.* Josef Kammhuber advanced the ground support system. His first priority lay in extending the searchlight zones to either side of their current West German location, north to Schleswig/Holstein and south to Liege in Belgium, as well as being thirty kilometers in depth; ground radar control was introduced, using the *Freya* and *Wuerzburg* equipment. This stage was titled *dunkel Nachtjagd* (*Dunaja*) and would present an enhanced prospect of a successful aerial interception; separate radar linkage to the flak batteries was also introduced that added a further threat to the bombers, with the first kill inflicted during October 1940.

Staccato as these defensive measures might seem and probably were, their effect on Bomber Command operations slowly began to have a deleterious effect in aircraft and crews; losses in 1940 of seventy-two—forty credited to the night fighters—rose sharply to 400 out of 700 arising from 1941's comparative subtotals. The majority of the aerial *Abschuesse* had still relied on some form of ground radar guidance, but the ultimate advance to independent guidance was already on hand in the form of the onboard *Lichtenstein BC* (FuG202) electronic equipment. The equipment was an adaptation of the Telefunken AG's *Lichtenstein A* radio altimeter, operating on a 60 cm wavelength; the need for external aerials whose size proved to be speed as well as performance sapping could be countered only by introducing centimetric wavelength sets that would largely dispense with these structures. This proved to be a development that lagged well behind RAF standards until the conflict was irretrievably heading in the Allies' favor.

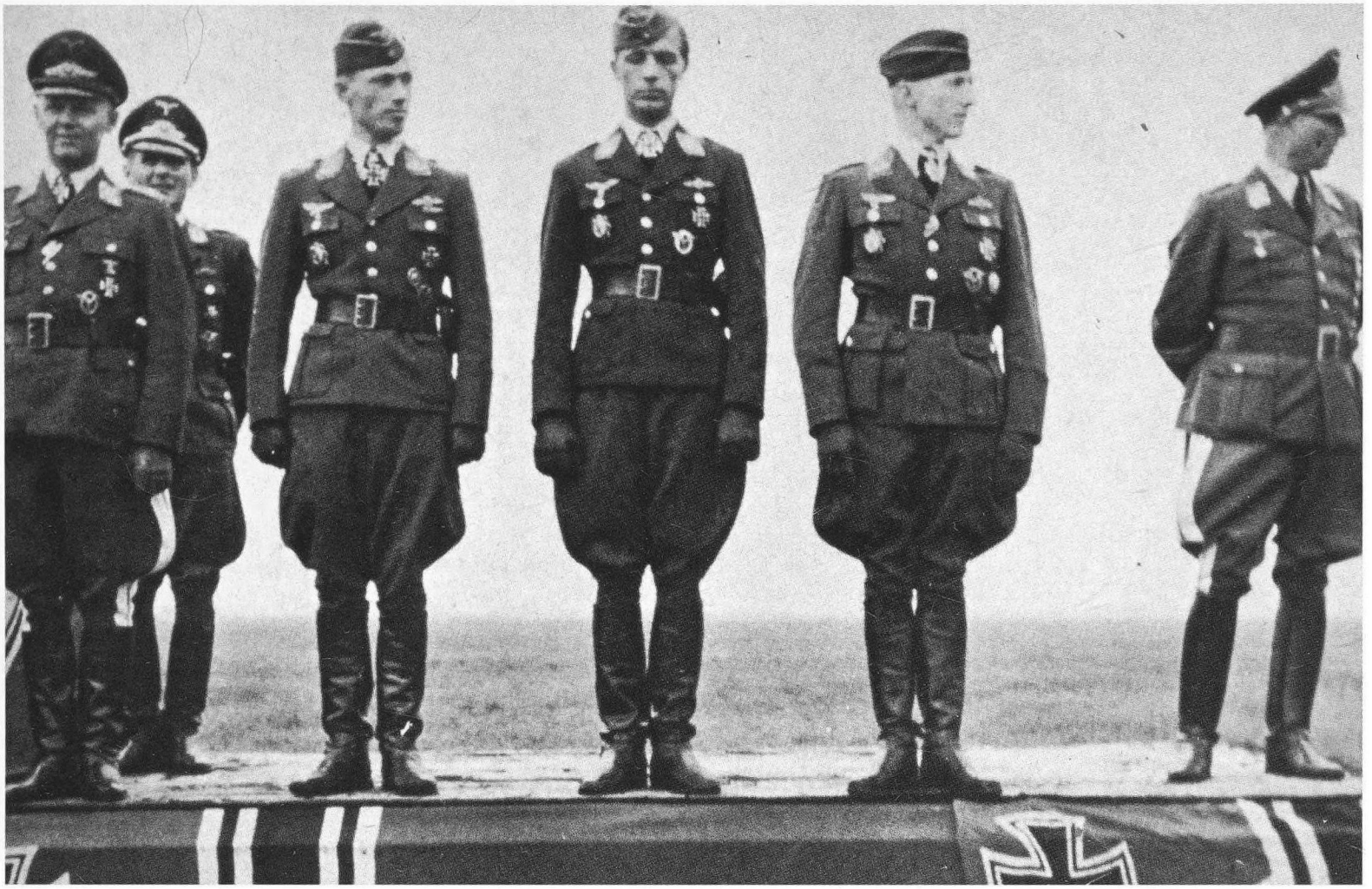
Another refinement known as *Himmelbett* (four-poster bed) featured control stations twenty miles apart, each employing two *Wuerzburg Riese* radar sets. One tracked the target, the other the night fighter, bringing the fighter to a range where its onboard radar equipment could take over. The night fighters were restricted to specific orbit zones close to their airfields—awaiting their prey in a spider/fly style—with the system's limitation being that only one target could be picked up and closed on at a time. Any other bomber or bombers in the immediate vicinity at the time had a good chance of slipping through (the advent of the "bomber stream" during mid-1942 would put a noticeable, albeit still-not-fatal, dent in this operational arrangement).

During what was the first stage of the nocturnal defense buildup between 1940 and 1942, the Bf 110 force employed a mix of C, D, and E aircraft, none of which were specifically intended for the duty. Initially, the crews were dependent on visual means to locate their targets, but the introduction of the initial *Lichtenstein BC* equipment in early 1942, along with *Lichtenstein C1* (FuG212) during the autumn, would bring about the ultimate independent interception system, which would be introduced from around August 1943 onward. From then on, the crews would be fed into the bomber streams, free at their leisure to seek out targets, as opposed to the tie-down limitations incurred under the *Himmelbett* system.

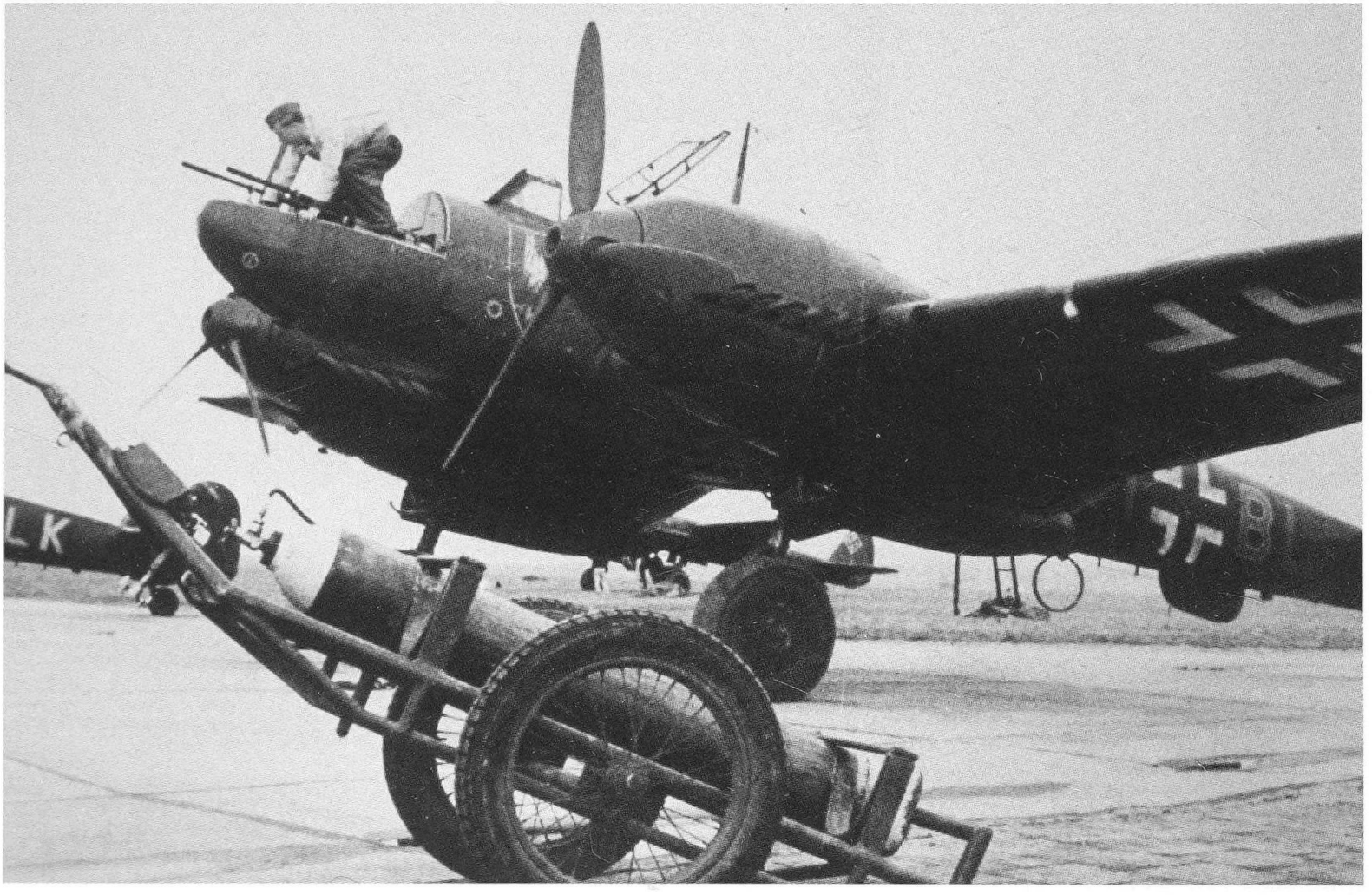
The creation of the *Nachtjagd* force, with which to defend the nation from nocturnal assault, has been credited to then *Maj.* Wolfgang Falke. He is snapped being presented with the *Ritterkreuz* (Knight's Cross) in recognition of his efforts as opposed to racking up a massive kill score; his tally was a modest seven prior to his elevation from *NJG 1's Kommodore* to permanent staff duties with *Luftflotte Reich*'s HQ in July 1943.



A collection of Bf 109Cs dot the surface of their assigned airfield. They are serving with *10./(N)JG 26 Schlageter* and represent the initial and necessarily primitive attempt to combat the incursions by RAF Bomber Command during the middle period of 1940. The deep radiator baths and two-blade propellers are prime features of this Bf 109 variant, which first entered service in 1938.



Josef Kammhuber (*left*) became the first commanding general of the *Nachtjagd* force, established in July 1940. He is seen with three *Experten* (aces) serving with the first-established unit, *NJG 1*, during a *Ritterkreuz* award ceremony for Becker. They are (*left to right*) Helmut Lent, Paul Gildner, and Ludwig Becker, none of whom would survive World War II. Gildner and Becker were lost on consecutive days during late February 1943, while Lent was killed in an accident during 1944.



The original overall *Schwarz* camouflage scheme displayed here by two Bf 110s assigned to *I./ NJG 1* ironically did not prove to be the correct shade for concealment from other aircraft. Instead, the steady introduction of lighter shades such as *Blau-Grau* (blue-grey) and retention of *Hellblau* (light blue) would prove to be far more effective.

The officer (*left*) conferring with *Maj.* Falck is *Maj.* Werner Streib, who is about to take over *NJG 1* from his fellow commander. Streib was credited with the *Geschwader's* inaugural *Abschuess* on July 20, 1940, when he brought down a Whitley. He ended the conflict as yet another high-scoring *Experte*, with sixty-eight *Abschuesse*, and subsequently served as a general within the postwar *Luftwaffe*. His *Ritterkreuz* was awarded in October 1940.

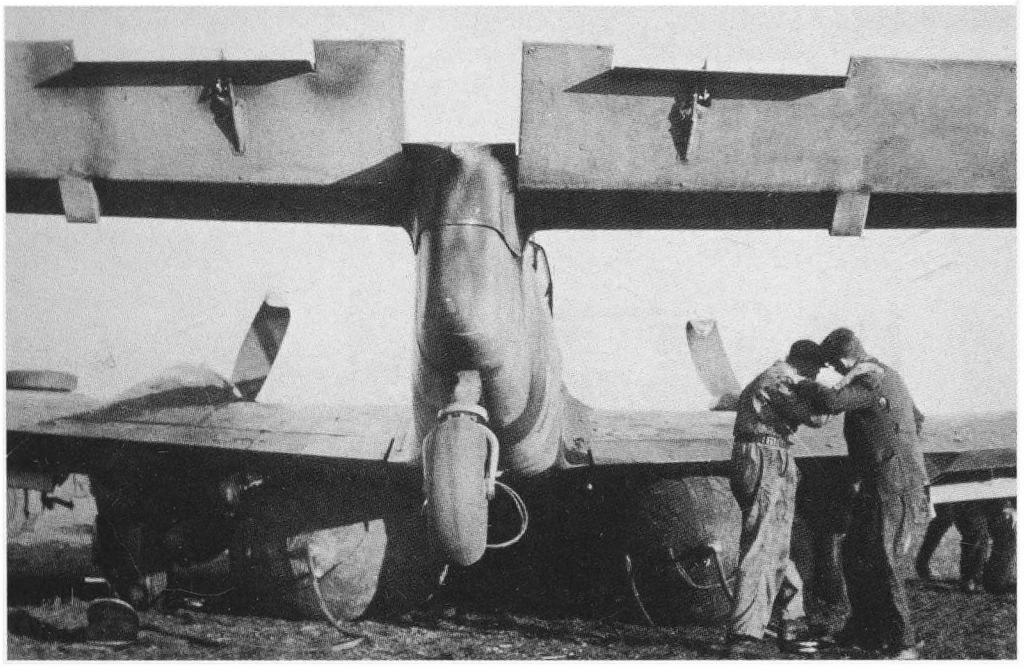
The sizeable nose section on the Bf 110 night fighters was a perfect backdrop for the *Nachtjagd* symbol, designed by Werner Mölders's brother, Viktor. This consisted of a map of Britain, upon which a lightning-bearing eagle is diving. The badge's title was *Engelandblitz*. Viktor, unlike Werner, who was killed in an accident in late 1941, survived the conflict, but only as a POW, while flying with *JG 51*, being downed in October 1940.

A mechanic is attaching the oxygen supply pipe to the filter point on a *3. Staffel* Bf 110 as his colleague applies himself to the rear gunner's 7.92 mm MG15 weapon. The box unit seen inside the cockpit, directly below the radio antenna mast, is the AAGI antenna adapter (*Antennen-Anpassungs-Geraet*) for the EB1 receiver, which is part of the blind-approach landing system.

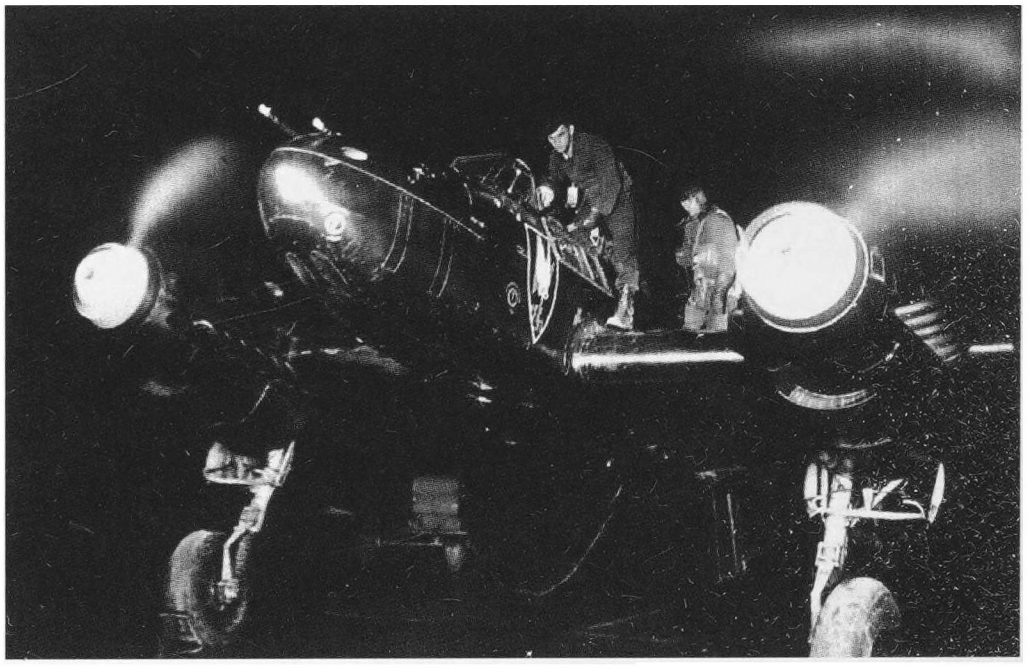
The overalls worn by Luftwaffe ground crew earned them the nickname *Schwartzer-maenner* (black men—mechanics). This airman is examining the barrel of a 7.92 mm MG17 to ensure it is free of dirt, a basic but vital aspect of weapon maintenance. The *Englandblitz* emblem bisects the seam line between the nose and central fuselage sections.

A ground crew member is standing by the port fin and rudder of a Bf 110 that bears a (sadly) impressive triple row of *Abschuesse* vertical bars, whose white outlines are further highlighted by the night fighter's black camouflage. Such scores were destined to be equaled and indeed well exceeded in some instances as the *Nachtjagd* crews bit ever deeper into the ranks of RAF Bomber Command.

Two *Schwartze-maenner*—who ironically are wearing white-colored overalls—are poised alongside the port main landing gear of a Bf 110; the variant is believed to be a D-1, but this remains unclear. The *Englandblitz* emblem is highlighted by the overall shiny, black finish; this would give way to a lighter camouflage pattern that made the night fighter more difficult to discern, especially when closing-in on a bomber from below.

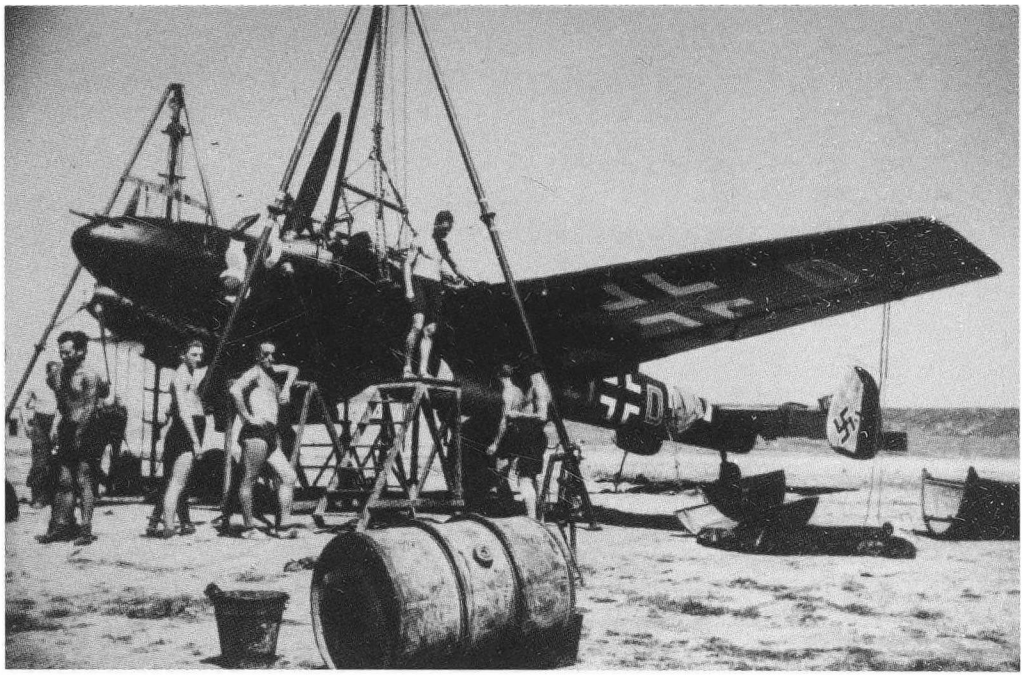


A Bf 110 has been safely brought down for a forced landing by its pilot and now awaits resurrection onto its landing gear. The use of airbags will bring about the change, but the pace of the action will be painfully protracted if the foot pump being operated by one of the ground crew remains the sole source of inflation!



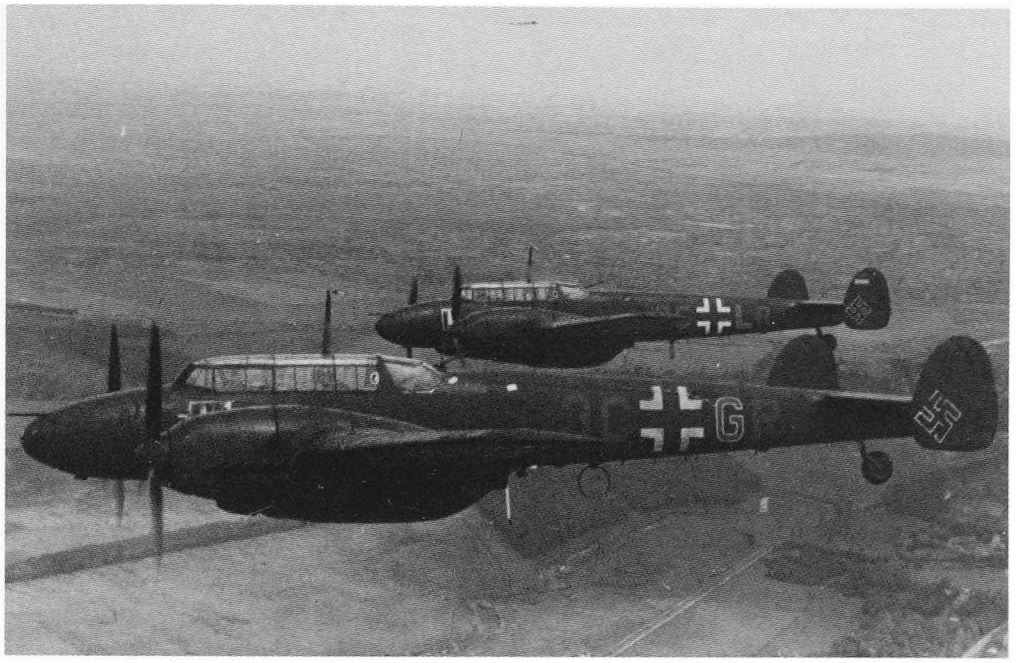
An unconsciously dramatic pose is struck by a Bf 110 as its crew prepares to take off on a sortie. The DB601 engines are opened up to full bore, with the propeller blades virtually invisible as a ground crew member assists the pilot to settle into his position and the gunner prepares to take up his seat. The absence of radar aerials on this anonymous *Nachtjagd* fighter likely dates the picture to the 1940–41 period of visual search aided by searchlights or even flak battery gunfire.

The Dutch airfield of Deelen provides the setting for a Bf 110E, this variant being confirmed by the shallow scoop centered on the nose and between the upper pair of MG17 machine guns. The fuel bowser's hose is being deployed by the two airmen in readiness for replenishing one or more of the four internal tanks, which between them hold a total of 279 gallons.

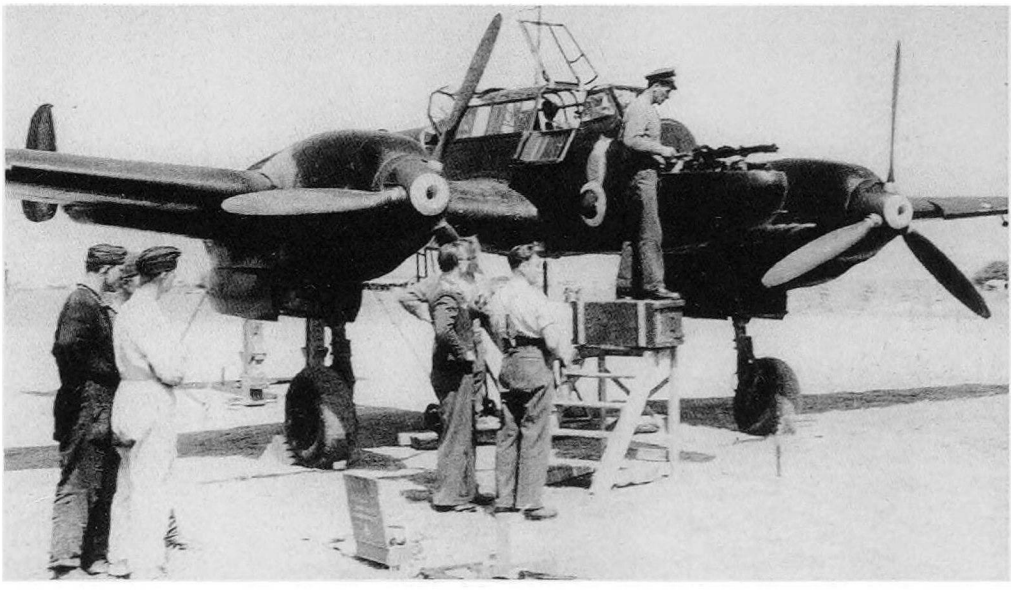


Following involvement in the Battle of Britain, *V./(Z)LG 1* was renamed *I./NJG 1*. In February 1941, the unit was transferred to the Mediterranean Theater of Operations (MTO), where it came under *Fliegerkorps X*'s control. The overall *Schwartz* finish on the Bf 110C is partially compromised by the white band applied to the upper-rear fuselage, ahead of the stabilizer. The owl and half-moon insignia adorns the fuselage below the windshield. The aircraft letters are probably outlined in red.

The Bf 110's radio mast was a combined wood/metal fitting offset to port on the central cockpit frame. The antenna wire(s) were insulated at both ends; this later single-mounted item extends to the starboard fin top. It acted as an auxiliary source for the EZ2 *Zielflug-emfaenger* (radio direction-finding receiver) and a *Bakenstab* (beacon rod) for the EB1 *Funklande-emfaenger* (radio beam receiver). *Nur hier anfassen* at the base means "touch here only."



A *Rotte* of Bf 110s assigned to *III./NJG 4* and bearing the *7. Staffel* letter "R" fly a tight formation with the photographer's aircraft. The nearside aircraft is probably a D-3, with the extended tail; the straight line of the rear fuselage underside compared to the curved pattern on what is a C variant on 3C+LR gives credence to the observation. The white *Balkenkreuz* surround somewhat compromises the camouflage intention behind the dulled-down code letters.



A Bf 110C of *I./NJG 3* based at Deelen during 1942 is raised up for gun orientation. The night fighter in question, which bears an owl sitting on what looks like a number *3*, was flown by a *Ltn.* Niklas. During the 1,000-bomber raid on Köln (Cologne) on May 30–31, 1942, he had to force-land his aircraft following damage inflicted during an encounter with a bomber. He survived the experience but was subsequently killed in action.

CHAPTER 5

Bf 110D

The Bf 110D was the immediate follow-up to the C variant, which demonstrated just a single external alteration in basic outline. The D-0 preproduction group of airframes for what was intended to display a long-range function witnessed the introduction of a massive ventral fuel tank with a capacity of 1,200 liters (264 gallons). That earned the variant the nickname of *Dackelbauch* (Dachshund belly). The plywood structure was relatively easy to mount into positions, and a narrow aluminum band covered the union of the tank top edge with the fuselage base. There was nevertheless a tendency for the unpressurized tank to leak, while the danger of an explosive effect should the tank be struck by gunfire presented a likely lethal fate both for aircraft and crew.

This was demonstrated starkly on August 15, 1940, when *Hptm.* Werner Restemeyer, the *Kommandeur* of *I./ZG 76*, based in Scandinavia, was leading the *Gruppe* toward northeast England in support of *KG 26*'s He 111s. One of the RAF fighters making the first pass on the Luftwaffe force landed strikes on the fuselage, which undoubtedly also impacted with the tank; the resultant massive explosion killed both crew members as the Bf 110D (M8+AB) was torn apart to become one of eight MIA casualties.

Three subvariants of the Bf 110D-1 were in service, beginning with the R-1, which regained the MG/FF cannon displaced on the Bf 110D-0. The D-1/R-2 dispensed with the ventral fuel tank in favor of large 900-liter external tanks mounted under the outer wings. The last subvariant was the Bf 110D-1/U-1, which was the first to be specifically assigned to a night fighter function. In addition, the U-1 designation related to the initial attempt to track down a target by other than visual means. The *Spanner-Anlage* was a piece of infrared equipment positioned in the starboard side of the cockpit and attached to the windshield frame. The crew complement was added to by a *Leitoffizier* who operated the telescopic-shaped set that was expected to pick up the emissions from a bomber's engine exhausts. No tangible results were achieved by the crews flying the D-1 airframes so equipped, however.

The D-2 witnessed a potential return to the *Dackelbauch* fuel tank, along with an alternative fitting in the shape of ETC500 bomb racks, which provided a 1,000-kg total load capacity. The final D-3 variant was assigned to a fighter-bomber role and moreover displayed the sole physical variation. This was in the form of a rear fuselage extension of just under two feet, within which was stowed a crew dinghy. After ditching, release was effected via a cable running along the fuselage portside and attached to a side panel of the extension; the gunner pulled a lever, whereupon the dinghy emerged from the now-panelless space, although the crew reportedly would have to swim to the spot and drag it fully out—nonswimmers having a problem.

Service as a fighter-bomber in the Russian and Mediterranean operational theaters proved to be a more suitable function for the design, at least up to the advent of more-challenging fighter opposition. The Soviet fighter types during 1941–42 largely provided no more than an average to poor performance range. In North Africa, the presence of Hurricanes and P-40s could present stiffer opposition, but their numbers were none too great over roughly the same period of operational activity as experienced by the Luftwaffe units operating in northern climes.

Umruest-Bausaetz and *Ruest-Saetz*

The Luftwaffe utilized a series of equipment adaptations to enhance operational efficiency; these were subcategorized as follows: *Umruest-Bausaetz* covered equipment generally installed during production that was either for test purposes or as an assembly line modification. The second category, titled *Ruest-Saetz*, related to equipment installed postproduction either at depots or after the aircraft was assigned to a unit. The abbreviations "U" and "R" prefixed the specific number allocated to the individual adaptations within the respective group as shown within this chapter.

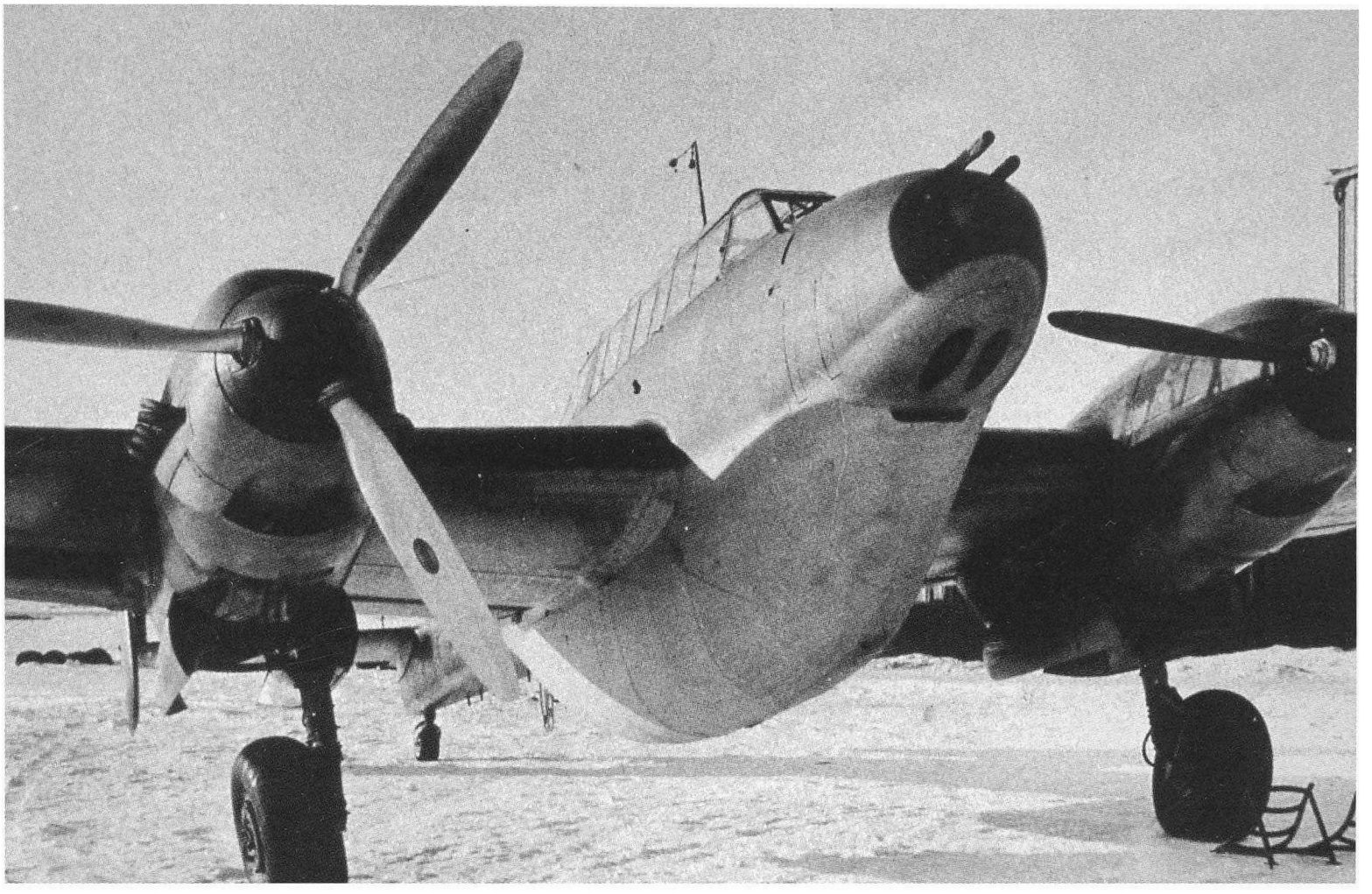
A smaller series of adaptations (seven) fell under the *Ruest-Saetz* category. They were prefixed either "B" for *Betriebs*, covering externally mounted fuel/oil tanks, and "M" for *Munition* (ammunition), with the latter applied to bomb rack and rocket tube equipment.

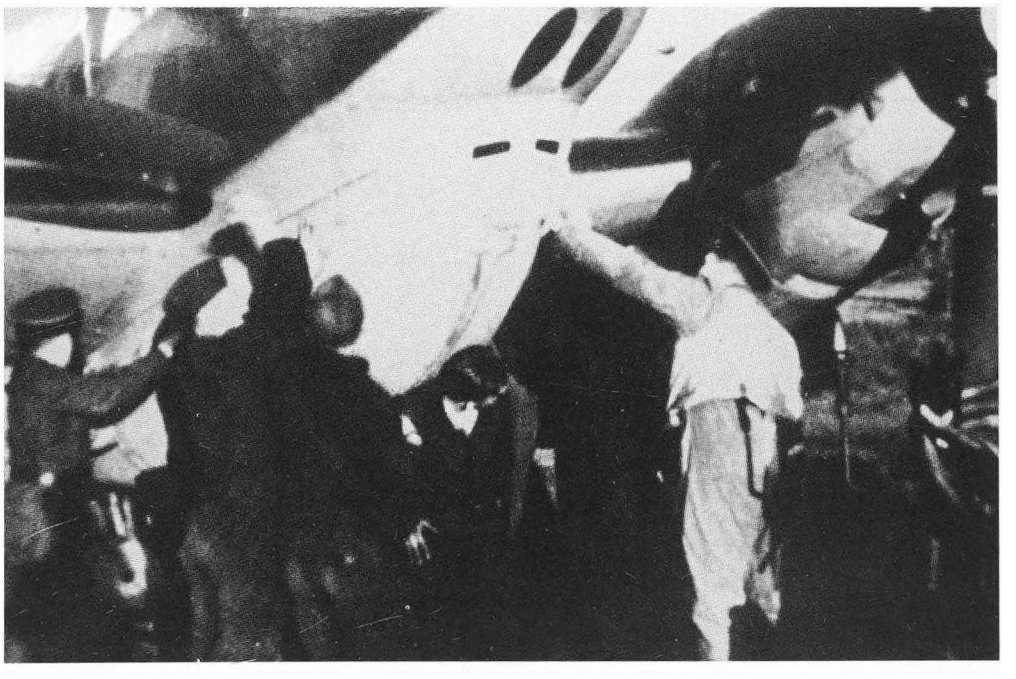
A production line of what are three Bf 110D airframes is seen during the later stages of construction. The aircraft in the center confirms its D-variant status, with the "belly" fuel tank in position; this and the rear airframe show the upper nose panels with their apertures for the machine guns revealed. The top panel arrangement for the gunner's position is also demonstrated on the nearside aircraft's cockpit frame.

The Bf 110D's external appearance was confirmed by the enormous auxiliary fuel tank, as seen on a D-1/R-1 serving with *ZG 76* at Stavangar, Norway, during the summer of 1940. The extra range afforded by the tank's capacity of 264 gallons was vital since the distance to any point in Britain from here extended over several hundred miles. The aircraft's overall maneuverability was inhibited to some degree with the tank in position.

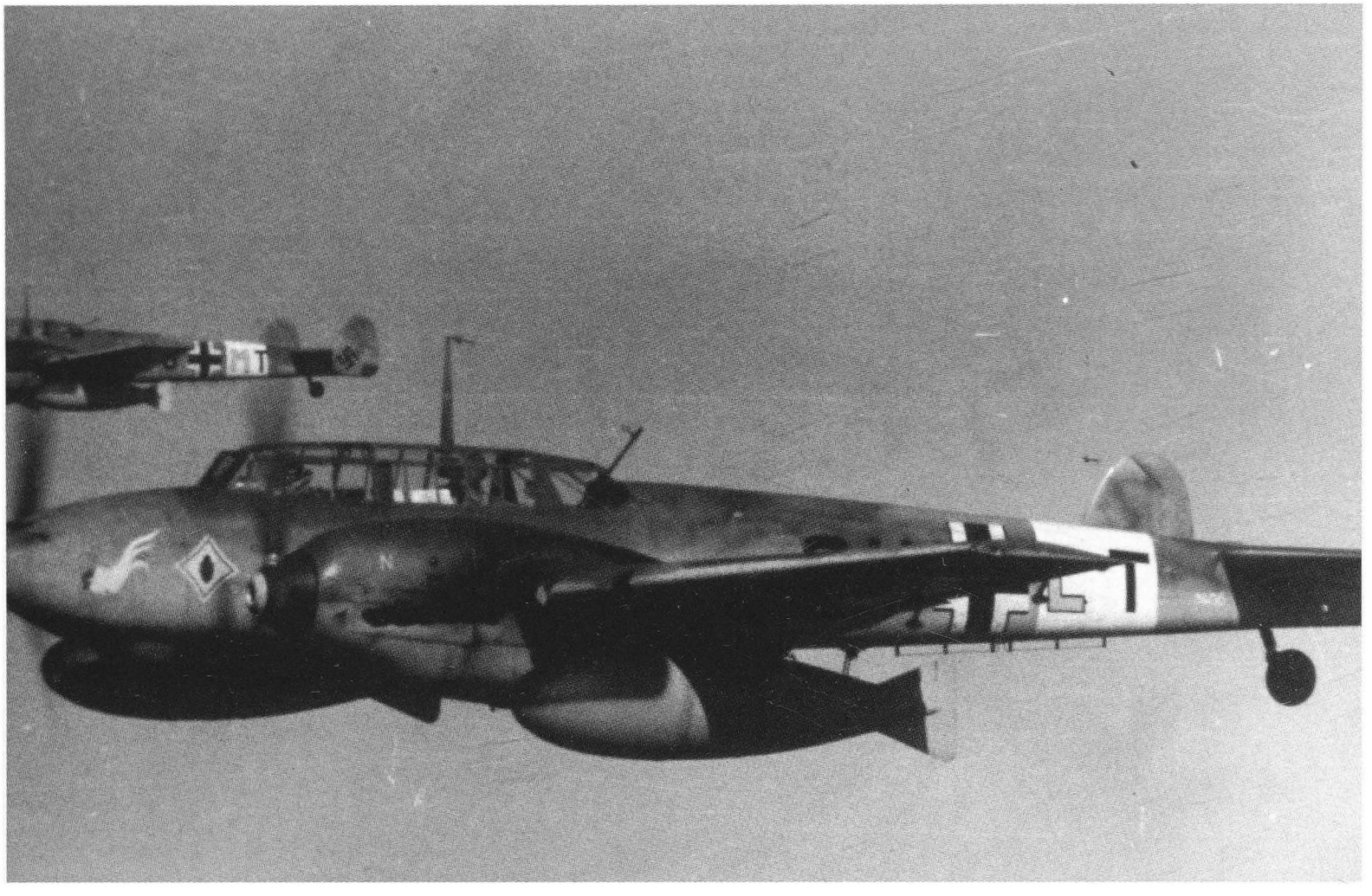
A lateral sight of a Bf 110D-1/R-1 of *3./ZG 76* confirms the speed-sapping bulk of the *Dackelbauch* (*dachshund's* belly) external fuel tank. Its unpressurized and leak-prone nature, as well as the presence of potentially explosive fumes when other than full, made for a lethal cocktail. A notable casualty was *Hptm.* Werner Restemeyer (*I./ZG 76 Kommandeur*). On August 15, 1940, strikes by a Spitfire almost certainly penetrated the now partially empty tank, resulting in a massive detonation that disintegrated the fighter and killed both crew members.

The third operational Bf 110D variant was given the designation D-3 and was intended to operate in the fighter-bomber role, although the potential Allied fighter opposition by the time it commenced service would have made the latter function rather difficult to achieve! A distinctive feature of the aircraft's outline was the extended rear fuselage, within which was contained a crew dinghy.

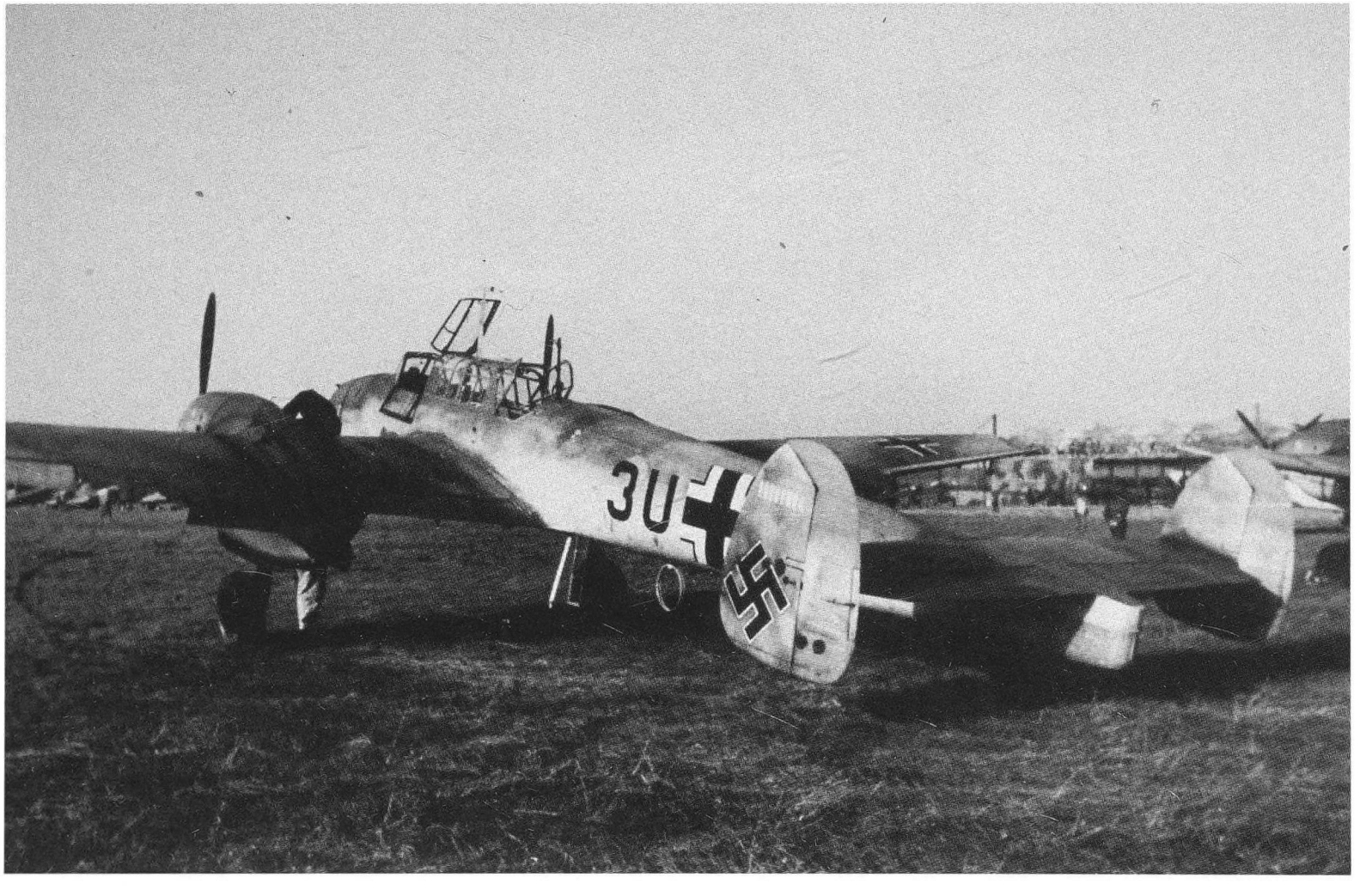




The duo of photographs clearly illustrates the attachment of the external belly tank to a Bf 110D-1/R-1. The first shows the vacant fuselage frame with its series of extended snap fasteners, which will secure the plywood-manufactured tank in place. The second photograph reveals the tank in position; the lightweight nature of the tank still required several personnel on hand to raise it into position.



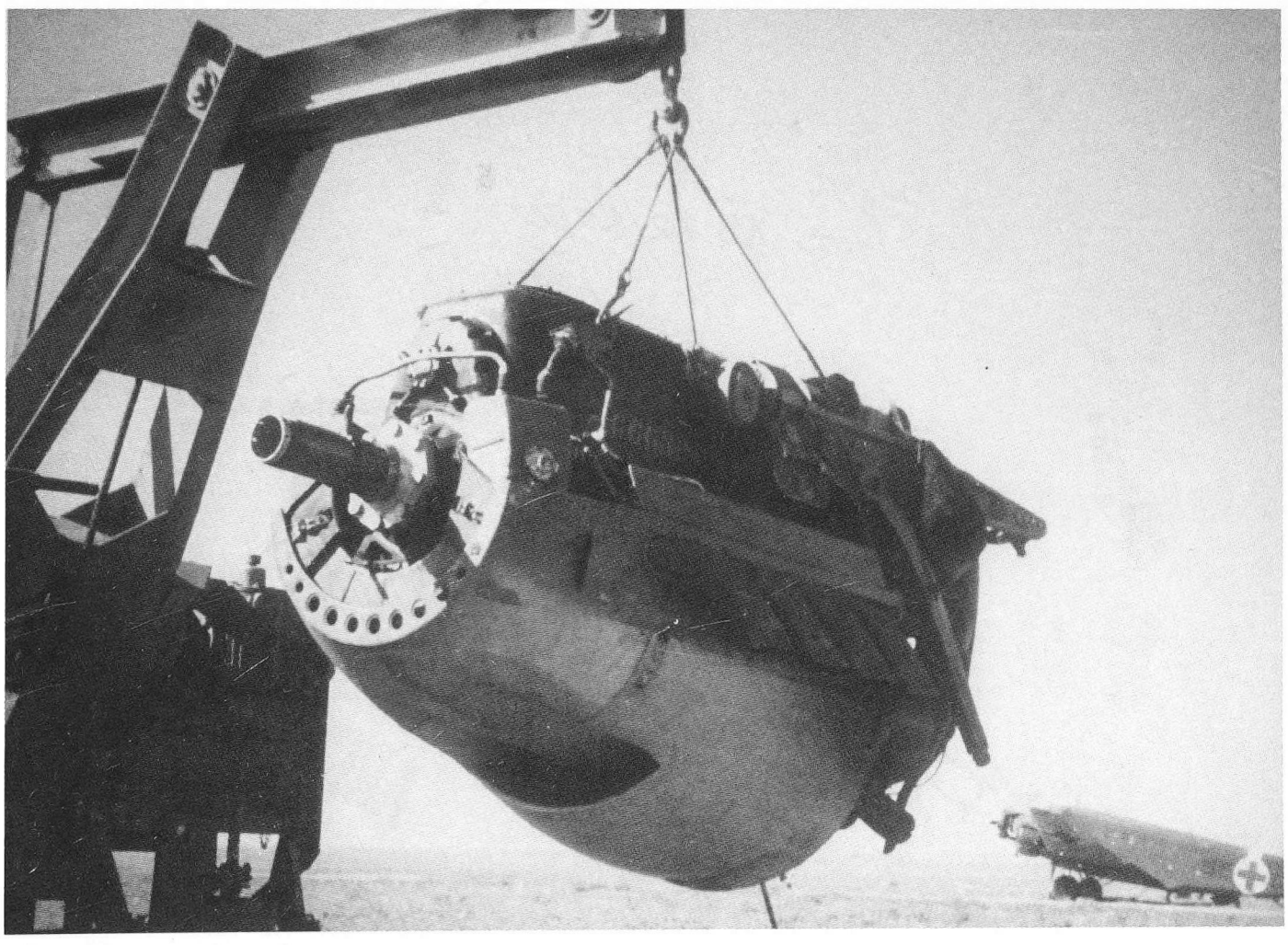
The Bf 110's extended range capability was further enhanced by the provision of drop tanks, in this instance with a 900-liter capacity. A regular duty in North Africa was the air cover granted to Axis convoys plying between there and Sicily or Italy. Both aircraft seen here are serving with *9./ZG 26*.



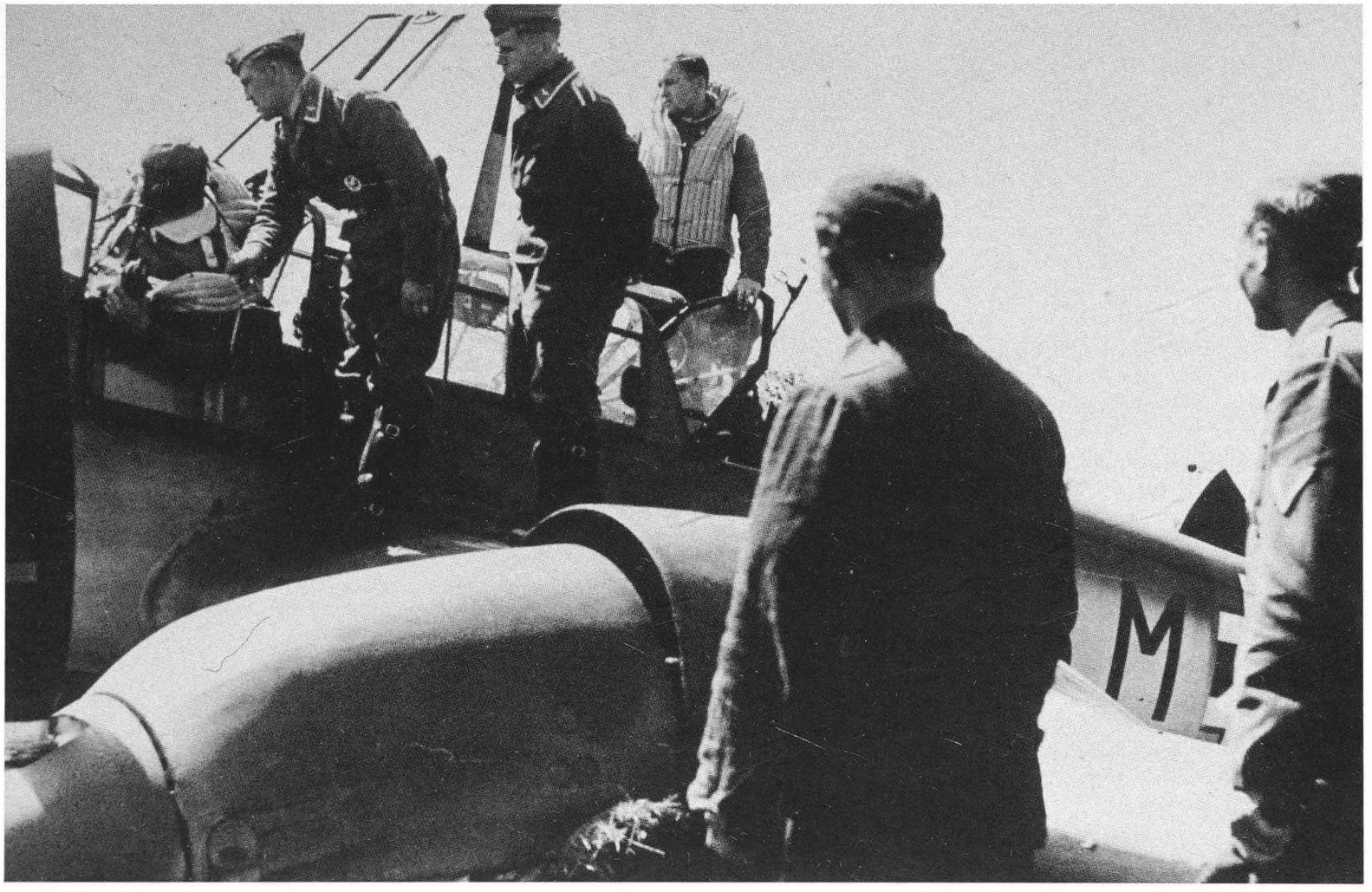
Although this Bf 110 assigned to *III./ZG 26* while in North Africa features the extended rear fuselage for the crew dinghy, the photo angle does not confirm whether it is a D-3 or E-2; the latter variant also featured the extended fuselage but possessed a nose scoop not fitted to the Bf 110D. Aircraft is believed assigned to *Fw.* G. Wegmann, who later flew in the *Reichsverteidigung* (Home Defense) and survived World War II with twenty-two *Abschuesse*.

A Bf 110D-3 is photographed while in service with a *Fliegerschule* unit. It is likely the aircraft that still bears the *Dackelbauch* ventrally fitted, 900-liter fuel tank has been relegated to this duty following frontline service. The pairing up of inexperienced trainee crews with what were often operationally exhausted aircraft was a potentially dangerous procedure that nevertheless was adopted both by the Luftwaffe and the RAF.

A mobile crane jib bears a DB601 that still has its lower cowling panel in place. The engine is a starboard wing-mounted example, judging by the downward-angled exhaust stubs on the port side; the starboard stubs are angled upward to prevent emissions from entering the underwing radiator—an arrangement reversed on port-mounted engines, with the same intention in mind. A *Sanitäts* (medical) Ju 52 is on the far right.

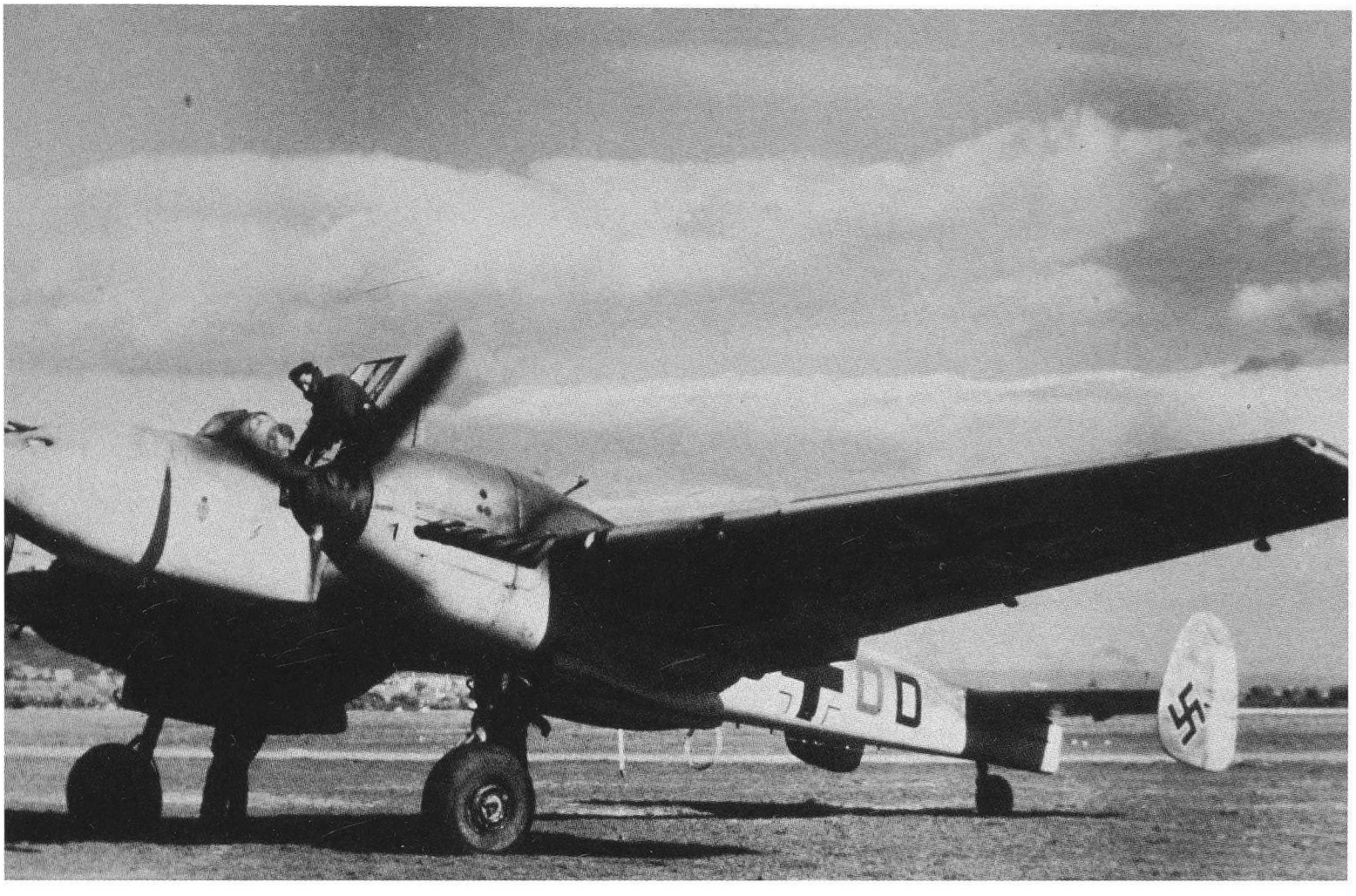


A Bf 110D of *9./ZG 26* is seen in the company of a Bf 109E-7/N belonging to *JG 26 Schlagater*. The unit numerical coincidence is further extended by the He 111 in the left background—it belongs to *KG 26 Loewengeschwader*! The Bf 110's engine cowlings are sprayed yellow, while the aircraft's camouflage is applied to the top of its 900-liter external tanks. Picture taken in North Africa.

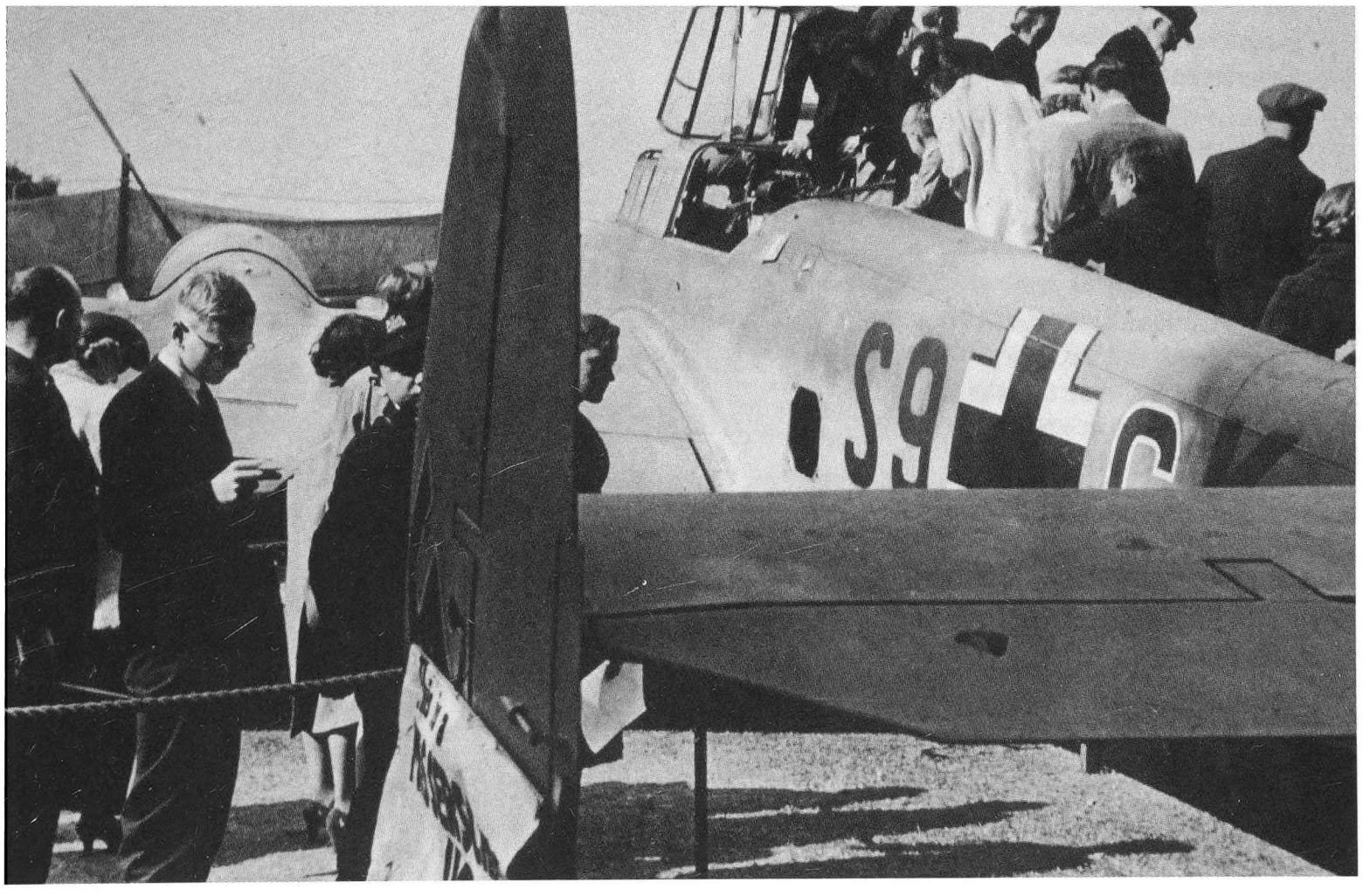


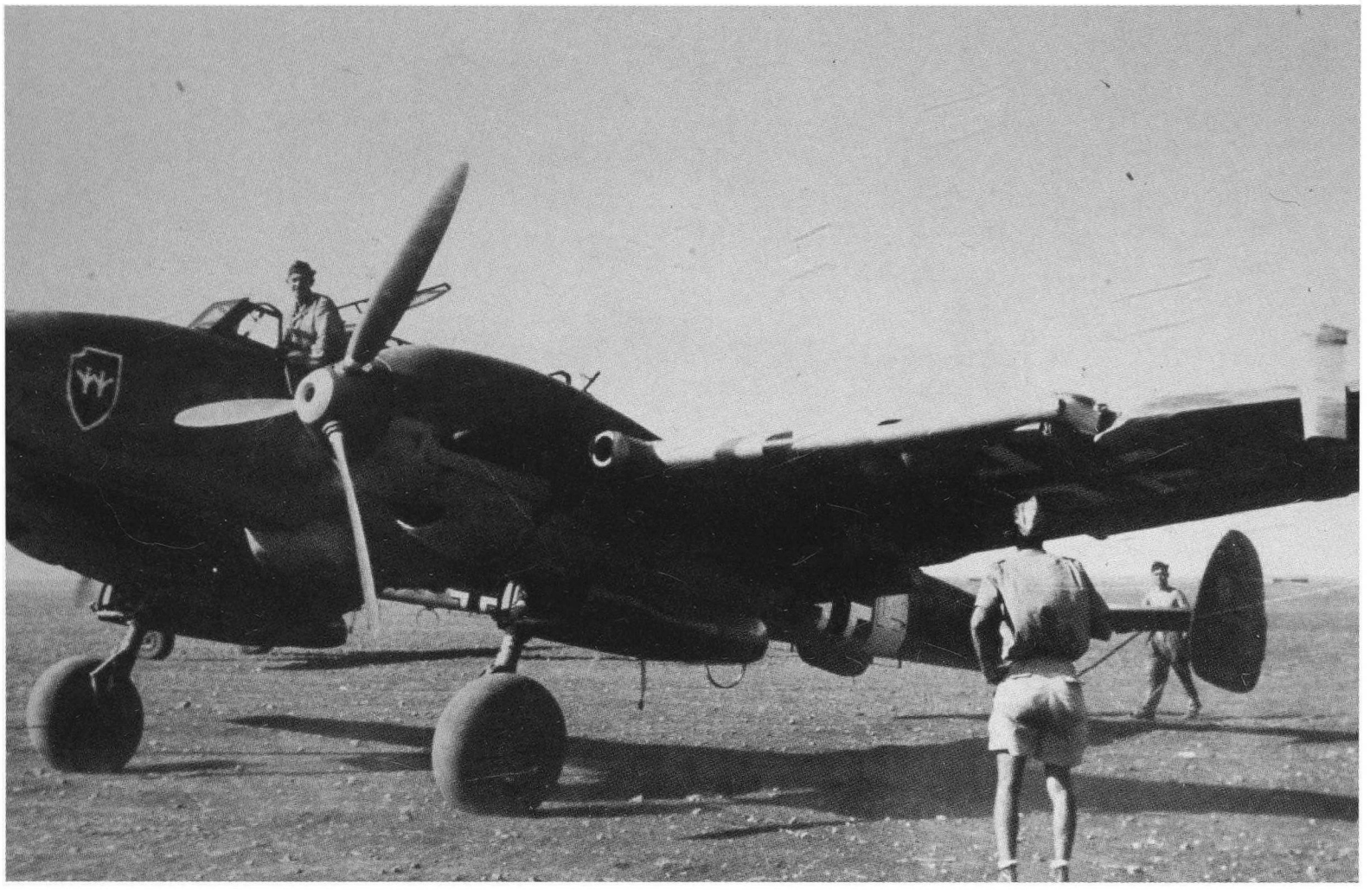
A Bf 110 has just been involved in a landing overshoot, and the result is a collapse of the port landing gear with a resultant dislodging of the DB 601 engine. The gunner, standing up, appears to have escaped serious injury, but the pilot, who has released his seat harness and is slipping off his life vest, probably needs assisting from the cockpit by the airman standing on the wing root. Aircraft belongs to *I./ZG 2*.

Two ground crew members are involved in starting up the port side DB 601 on a Bf 110 D-3, the variant being identified by the extended rear fuselage. The black letter "D" indicates a *Stab* machine with *III./ZG 26*; the aircraft letter "D" is green. The light-colored upper section on the fin could be a primer coat ready to be sprayed after damage repair has been completed.



Epr.Gr. 210 operated a mix of Bf 110C and D airframes during the Battle of Britain. One of the latter variant was crash-landed in Kent by *Oblt.* Haibusch during the costly accidental attack on Croydon airport, when the unit was cut to pieces. Nine days later the aircraft was on public display at RAF Hendon, as seen here. Its final destination was the United States, where it was exhaustively evaluated by the Vultee Corporation.



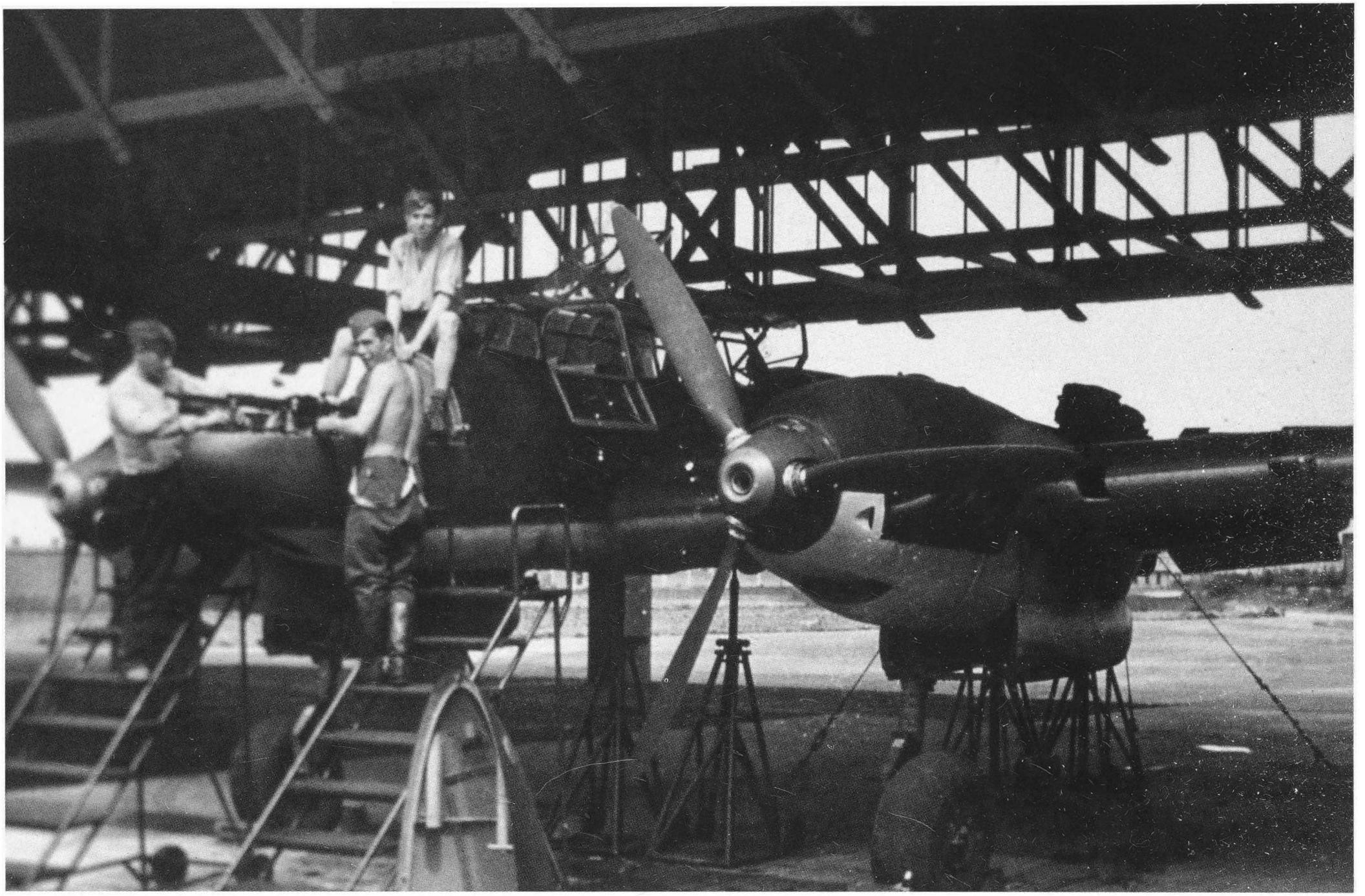


This Bf 110 serving with *ZG 26* in the MTO has received fairly serious damage to the port–outer-wing leading edge, but whether this was the result of battle damage or a ground accident remains unconfirmed. The shallow oil-cooler intake was standard on the DB600 series up to the -3, but the photo angle prevents specific variant identification of this particular fighter. The *Horst Wessel* nose emblem is applied to the nose compartment.

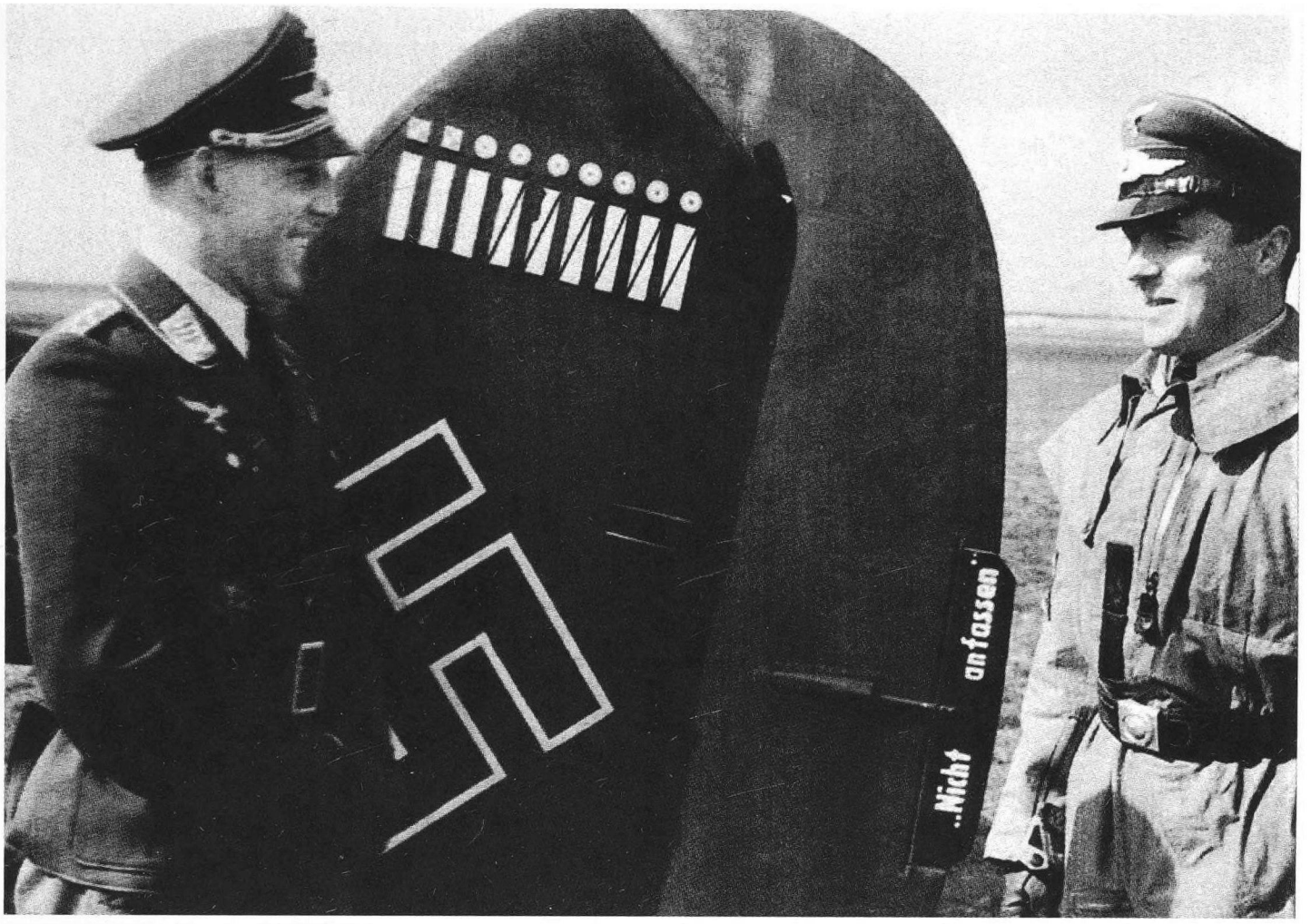
The baby-faced rear gunner of a Bf 110 is wearing the original life vest, which was filled with Kapok. His single 7.92 mm MG15 provided scant defensive capability against a fighter's multigun response, while the pannier ammunition containers had to be changed once expended. Note the handle that draws the canopy into the closed position. The canvas around the machine gun base blocks out the airflow through the semicircular frame.

The port engine's oil tank on a Bf 110 is being replenished by a mechanic. The exhaust stubs are angled up to prevent discharged gases from entering the radiator grill. Note how the panel surrounding the stubs is a separate item to the top and bottom main engine cowling panels. The forward connection point on the engine bearer frame is clearly visible.

The ever-mobile nature of the North African Campaign, with its vague to nonexistent front lines, regularly led to the capture of service personnel on both sides. In this case, three Sikh soldiers from an Indian unit are posing in front of a *III./ZG 26* aircraft. Whether they subsequently ended up as *Kriegsgefangener* (POWs) or volunteered their services to the *Afrikakorps* is unclear.



The open-sided but roofed structure supported by a firm ground surface, within which a Bf 110 is being attended to by its ground crew, provides a marginal degree of escape from the elements. The raising of the aircraft into a horizontal attitude is a necessary precondition for the gun harmonization check to take place. Note the detached upper nose panel resting on the steps frame; exposure of the interior reveals the metal sleeves through which the upper pair of MG17s are channeled.



Maj. Walter Ehle was a leading figure within the operational career of *NJG 1*. In the first photo, he is seen on the right in conversation with a senior-ranked officer. The fin of the Bf 110D bears *Abschuess* markings for two Polish and seven RAF victims, with the diagonally marked bars probably indicating nocturnal kills. The second picture shows him posed with his gunner alongside a *Stab II* night fighter. The *Maj.* did not survive the conflict, being killed during a landing attempt at St. Trond in the autumn of 1943.

CHAPTER 6

Bf 110E

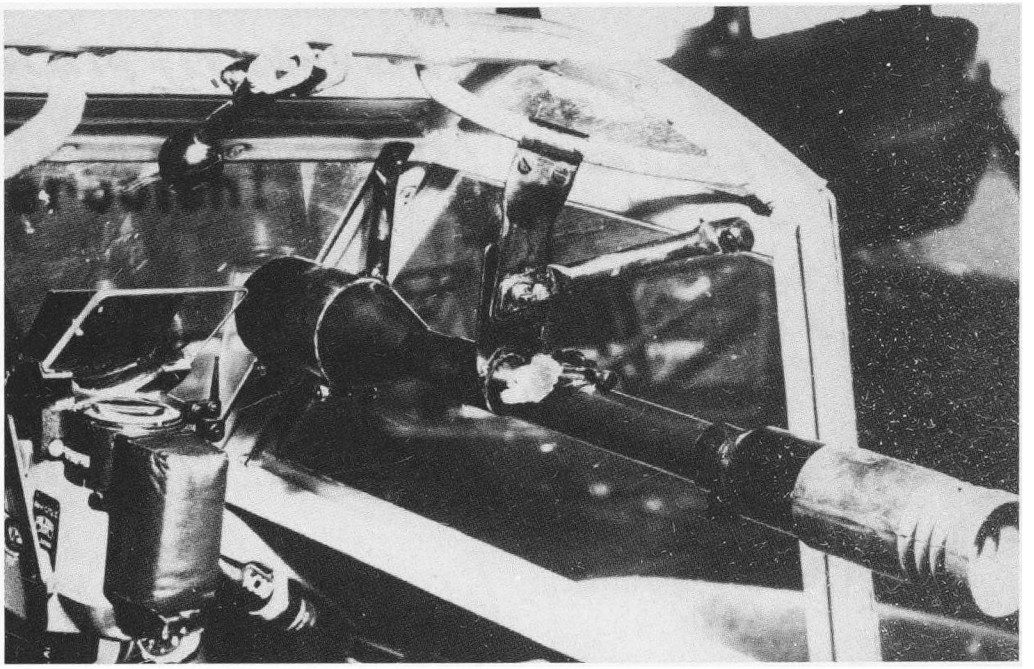
The fighter-bomber function allotted the Bf 110D-3 was carried over on to the Bf 110E. The preproduction E-0 was fitted with the same centrally mounted ETC500 racks, supplemented with pairs of ETC50 racks under the outer wings; the nose armament was as for the Bf 110C-4. (A future wing rack variation involved the "M4" adaptation, the SD2/XII-streamlined mounting that held a maximum of twenty-four SD2 Butterfly antipersonnel bombs and was used during antipartisan operations.) An external feature introduced on the E airframes was a centrally located small scoop on the upper nose.

As with the Bf 110D, a similar three-subtype sequence applied to this latest *Zerstörer*'s production range. As regards the Bf 110E-1, the DB600A engines on the preproduction airframes were displaced by the DB601N, with the letter being displayed on the cowling, but this was the sole alteration to date from its E-0 predecessor. However, there would be four further "U" and "R" variations. The Bf 110E/U-1 assigned to *Nachtjagd* duties involved the same *Spanner-Anlage* I and II infrared-detection equipment applied to the Bf 110D-1/U1. As with the Bf 110D1/U1, crew expansion to three, with the extra man being a *Leitoffizier* acting as a controller for the other unit aircraft, was introduced on the Bf 110E1/U-2; the aircraft concerned were used in the same fighter-bomber role. The Bf 110E-1/R1 involved armor provision around the cockpit, which presumably was applied comprehensively to this Bf 110 variant. The R2 adaptation involved a sizeable expansion in bomb-carrying capacity since it involved twin ETC1000 racks, the ETC50 wing racks being removed.

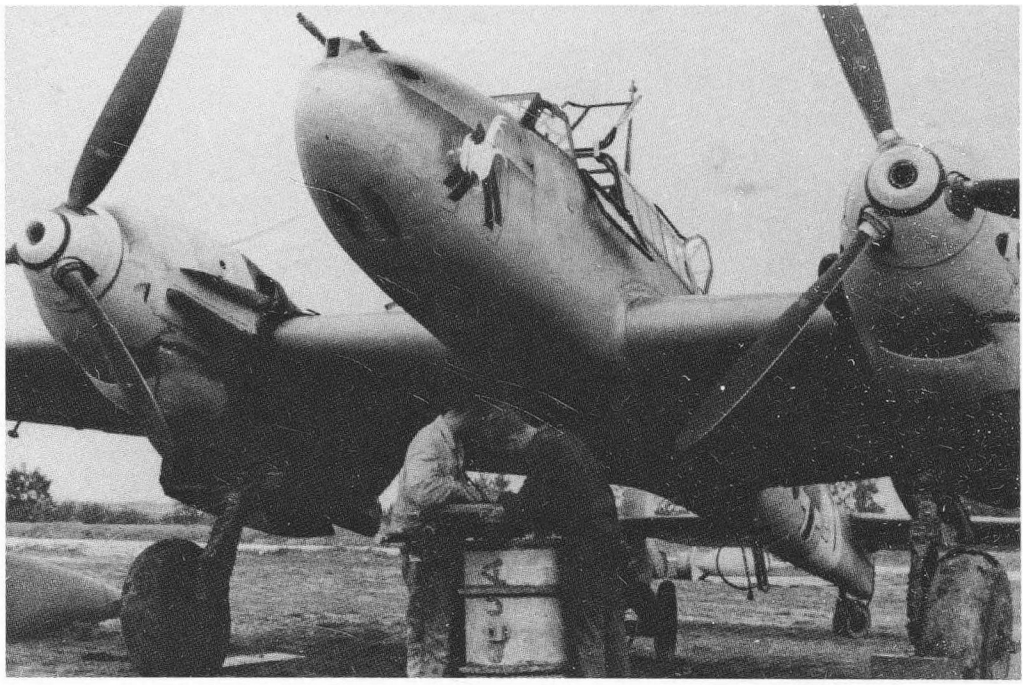
The Bf 110E-2 bore the same structural variation as the Bf 110D-3; namely, the rear fuselage extension accommodating the crew dinghy. A more passive role was assigned to the final Bf 110E-3 variant in the form of reconnaissance operations. As with its C-5 predecessor, the MG/FF cannon were removed and the standard RB50/30 camera equipment were mounted on the central cockpit floor. The reduction in nose armament to four MG17s was conversely reversed in terms of defensive capability, the rear gunner now being provided with a twin-MG17 mounting. The aircraft's maximum range was increased by the carriage of twin 900-liter external tanks.

The *Englandblitz* emblem on the starboard side of a Bf 110E and the overall *Schwartz* (black) airframe color confirm that this variant is serving in a night fighter role. The E-1/U-1 bore the *Spanner-Anlage*, which was designed to home in on RAF bombers by picking up emissions from their exhausts. Its presence alongside the pilot must have been physically inhibiting.

A Bf 110E-1 from *10./(Z)JG 5* is photographed in the snow-laden surroundings of northern Russia as several ground personnel clad in well-padded clothing gather around the nose area along with a *Bombenheber*. The bomb load will be attached to the fuselage ETC1000 bomb rack, which is just visible on the left and is designated R-2; its adaptation was made at the expense of the ETC50 wing racks.

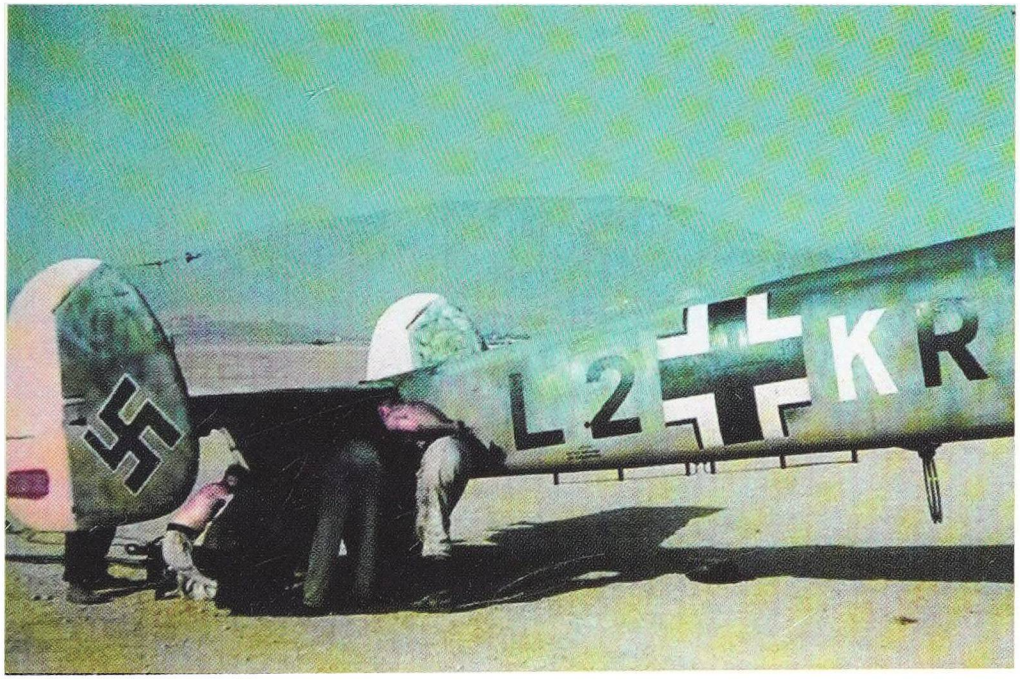


This is a close-up view of the *Spanner-Anlage* gear that was mounted on the starboard side of the pilot's cockpit. The crew complement was increased to three by the presence of a *Leitoffizier* who would operate the equipment. In the event that little success came the way of the aircraft so equipped, the sets were withdrawn. Note the heavy padding below the *Revi* gunsight, with which the pilot could avoid serious facial damage from a crash landing, for example.



The cockerel artwork on the nose of this Bf 110E-3, under which two ground crew utilize an oil drum as a crude working "platform," identifies the aircraft as being assigned to *III./ZG 26*. In common with its C-4 and C-5 predecessors, it is serving in a photoreconnaissance role with a ventrally mounted Rb50/30 camera and deletion of its MG-FF cannon armament; rearward armament is increased to two MG17 machine guns. The presence of two 198-gallon external-wing tanks further confirms the aircraft's E-3 status.

A Bf 110E is photographed after making a rather heavy crash landing in a field. The impact has resulted in the metal VDM propellers having had several blades twisted out of shape, but the basically intact nature of the airframe suggests that restoration to unconditional flight condition will be achieved. The 3U *Geschwader* code relates to *ZG 26*, but which *Staffel* is involved cannot be confirmed since the letters behind the *Balkenkreuz* cannot be discerned. The ESK2000b gun camera normally occupies the space behind the circular nose aperture.



The ground crew staff attending to Bf 110E LR+KR assigned to *7./LG 2* are concentrating on the rear fuselage section; what looks like the discarded tail wheel indicates that work is progressing on its mounting. The picture is dated to May 1941, and the geographic background suggests that the photo was probably taken somewhere in the Mediterranean Theater of Operations. The aircraft is either an E-1 or E-3, which lacks the rear fuselage extension applied to the E-2.

Several airmen of *II./ZG 1* then based at Briansk in Soviet Russia share what is a relatively stable dispersal point with one of their Bf 110E aircraft, on which the massive unit's wasp design on the nose has been beautifully applied. The absence of snow is not an absolute indicator that winter is past, since the aircraft in the background still bears the whitewash applied as a camouflage measure during that season.

What is a Bf 110E assigned to the *Zerstörer Staffel* of *JG 5* is snapped in foreign territory; in this instance, neutral Sweden. LN+FR was being flown by *Oblt.* Felix Brandis, the *Staffelkapitän* (CO). He commanded what was formerly *1./(Z)JG 77* until February 2, 1942, when he was killed following a crash on return from a sortie, an incident that left his gunner, *Fw.* Baus, alive albeit with severe injuries.

NJG 1 was the premier *Nachtjagd* unit, having been created in 1940–41. A group of four Bf 110Es are lined up on a Dutch airfield, their undercarriage main wheels wrapped in covers to preserve the surfaces from oil seepage emanating from the DB601N engines. The code letters are applied in a dull form against the black background; the well-preserved, civilian, open-topped car adds a marginally lighter aspect to what is the grim business of aerial combat.

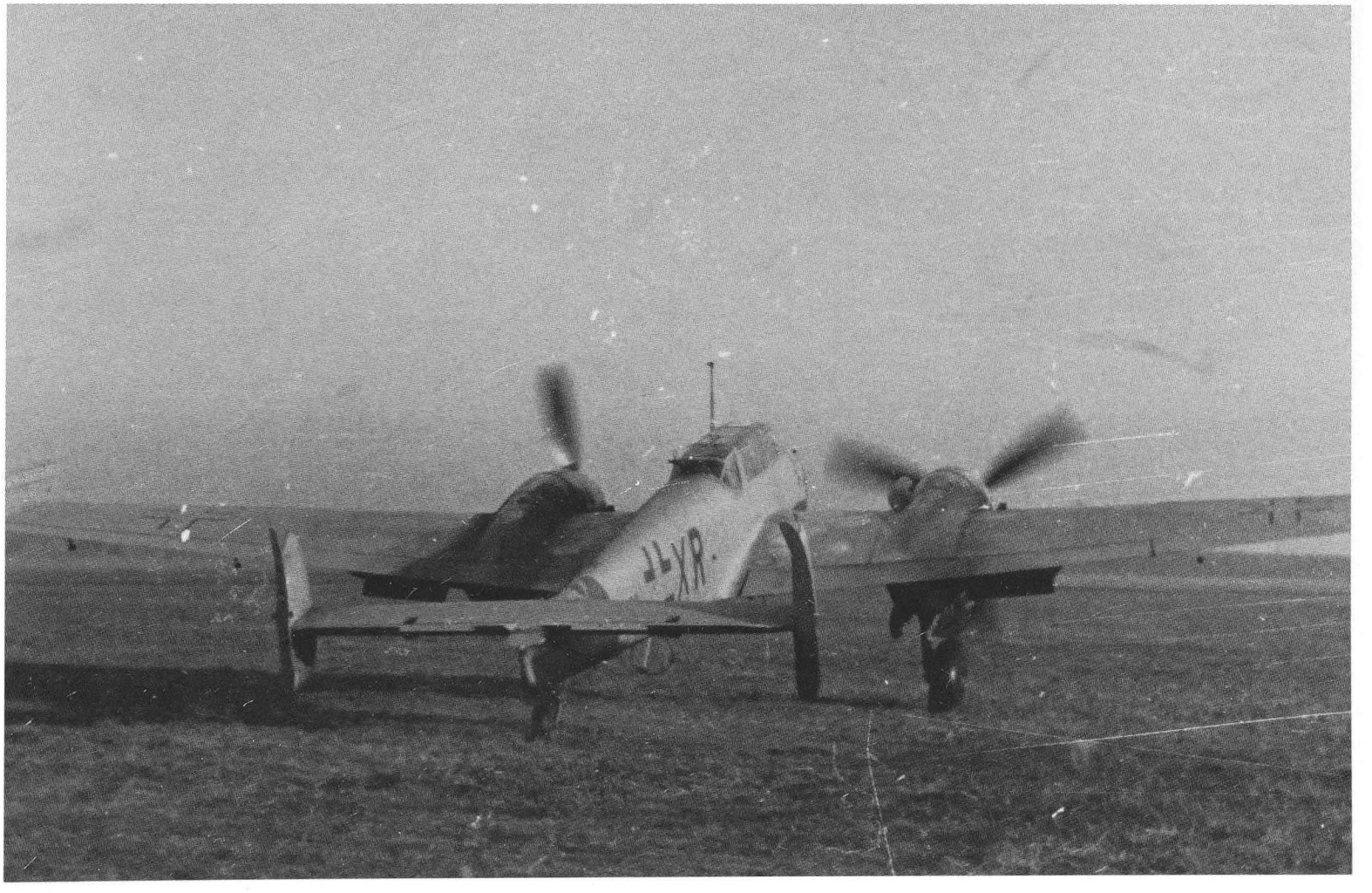
The artwork rather faintly seen on a Bf 110E's nose consists of a dachshund clutching a crushed Soviet aircraft in its mouth. This was applied to the *Dackelstaffel* of *JG 5*, which was the subunit exception to the *Geschwader*'s use of the Bf 109. The *Staffel* operated in northern Norway and Finland between June 1941 and February 1944, when it transferred to southern Norway. The film effect creates an impression of the propellers remaining static.

A group of what is probably Luftwaffe aircrew, judging by their outer garments, are gathered around and are discussing some operational aspect as a ground crew member stands by the cockpit. The clog design indicates a *I* or *II./ZG 26* machine that is an E variant, judging by the nose scoop and DB601N engine with the original shallow air intake for the oil cooler.

The featureless aspect of the North African terrain forms a daunting backdrop to this Bf 110 belonging to *7./ZG 26*. The extended rear fuselage and what appears to be a nose scoop indicate that this is an E-2 variant of the Messerschmitt twin engine. Note the streamlined 75-liter oil tank positioned ahead of the D/F loop. The white band backing the *Gruppe* code denotes MTO assignment.

A Bf 110E-3 coded L2+SR serving with *7./(F)LG 2* is snapped along with a seemingly camera-shy member of the *Staffel*. The nose area of the aircraft is adorned in yellow, while the tips of the propeller spinner are neatly colored white; tethering wires extend down from the outer wing panels. The aircraft was then stationed near Sofia in the Romanian countryside, but whether it is depicted prior to or following the invasion of the Soviet Union is unconfirmed.

Unlike its adversaries, the Luftwaffe camouflaged their aircraft to match the natural conditions of light. This Bf 110E-2 belonging to *7./NJG 4* reflects the tendency to provide a light scheme. RAF crews looking downward would experience great difficulty in picking out an aircraft so sprayed, while the ever-lighter natural visibility gazing upward would conversely make the task of picking out aircraft easier for the *Nachtjagd* personnel.

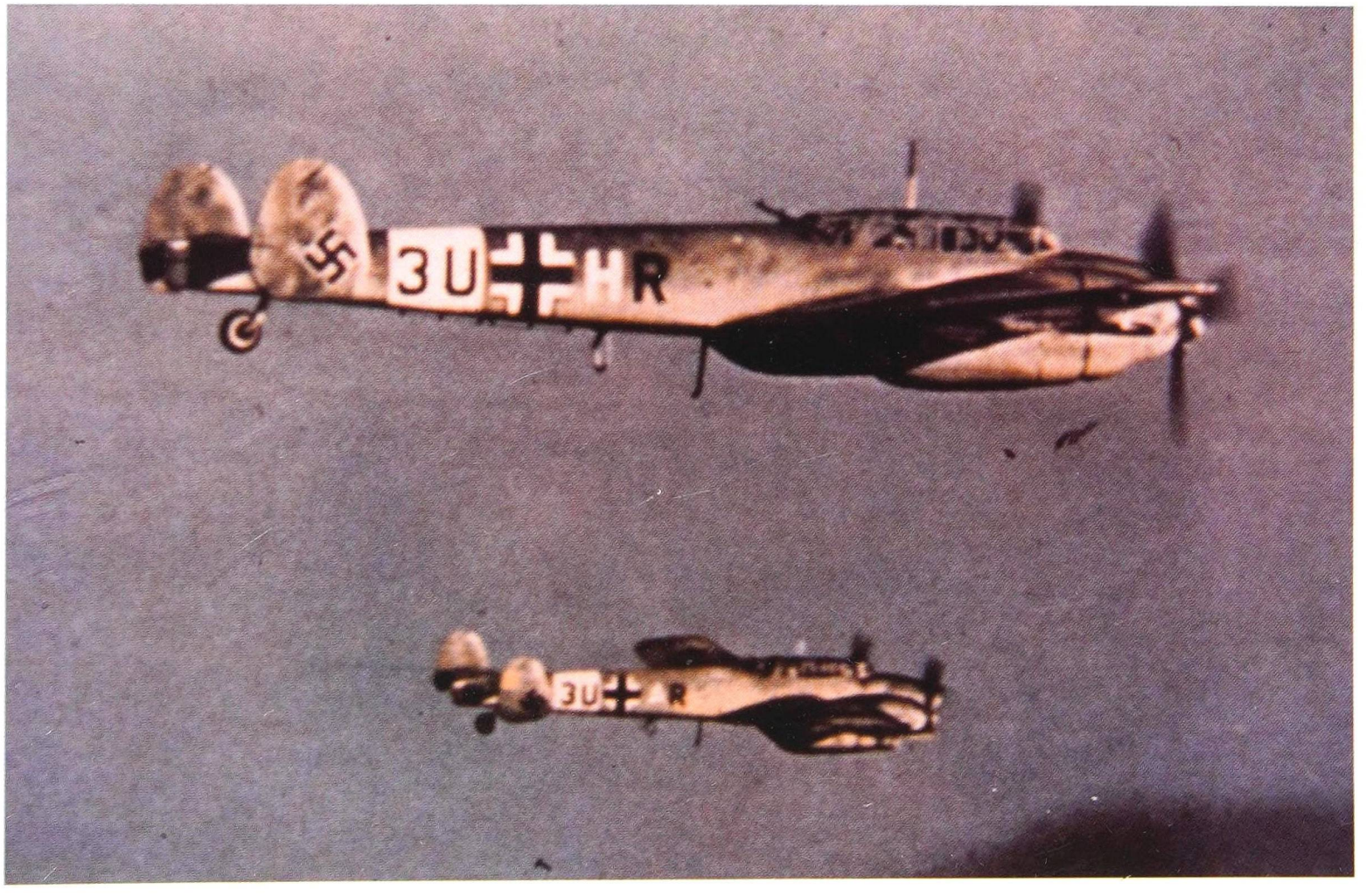


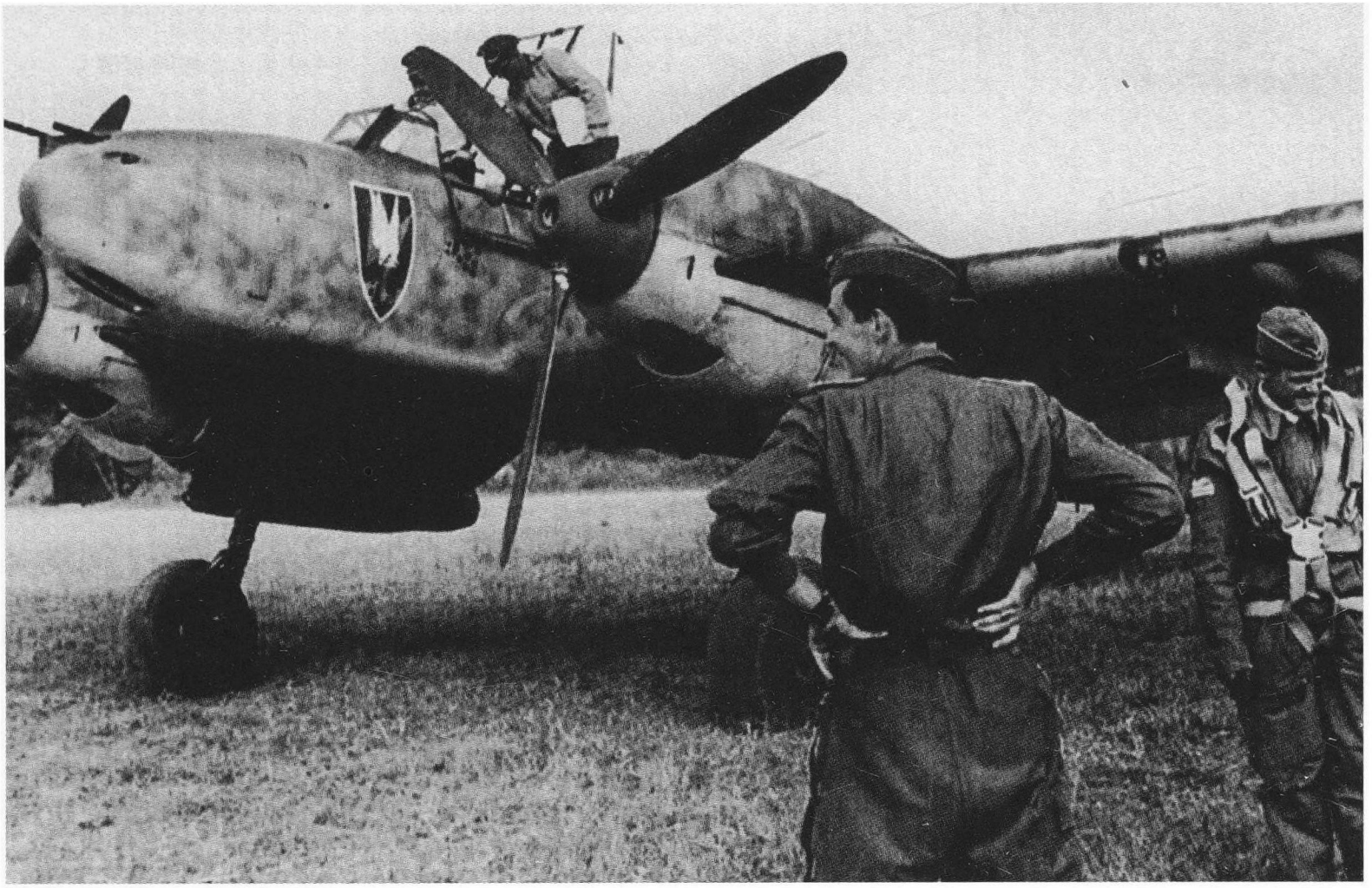
The geographic proximity of Sweden to its Norwegian "neighbor" ensured that Luftwaffe aircraft would inadvertently stray into the neutral country's territory. In this instance a *(Z)JG 5* Bf 110E is pictured after landing there. The outer surface of the starboard fin seems to bear a number of kills on the upper surface. Note the nose surface's dachshund artwork, from which the subunit derived its *Dackelstaffel* name. The propeller spinner cover has dispensed with the standard central aperture but still retains a miniscule-sized hole.

What is referred to as a Bf 110E-1 is snapped in friendly territory other than in the Third Reich. The clue to this relates to the uniforms of most of the personnel, who are Finnish in nationality; only the two airmen up on the wing and partially concealed by the propeller blade are Luftwaffe staff. The shark mouth design indicates a *ZG 76* fighter.

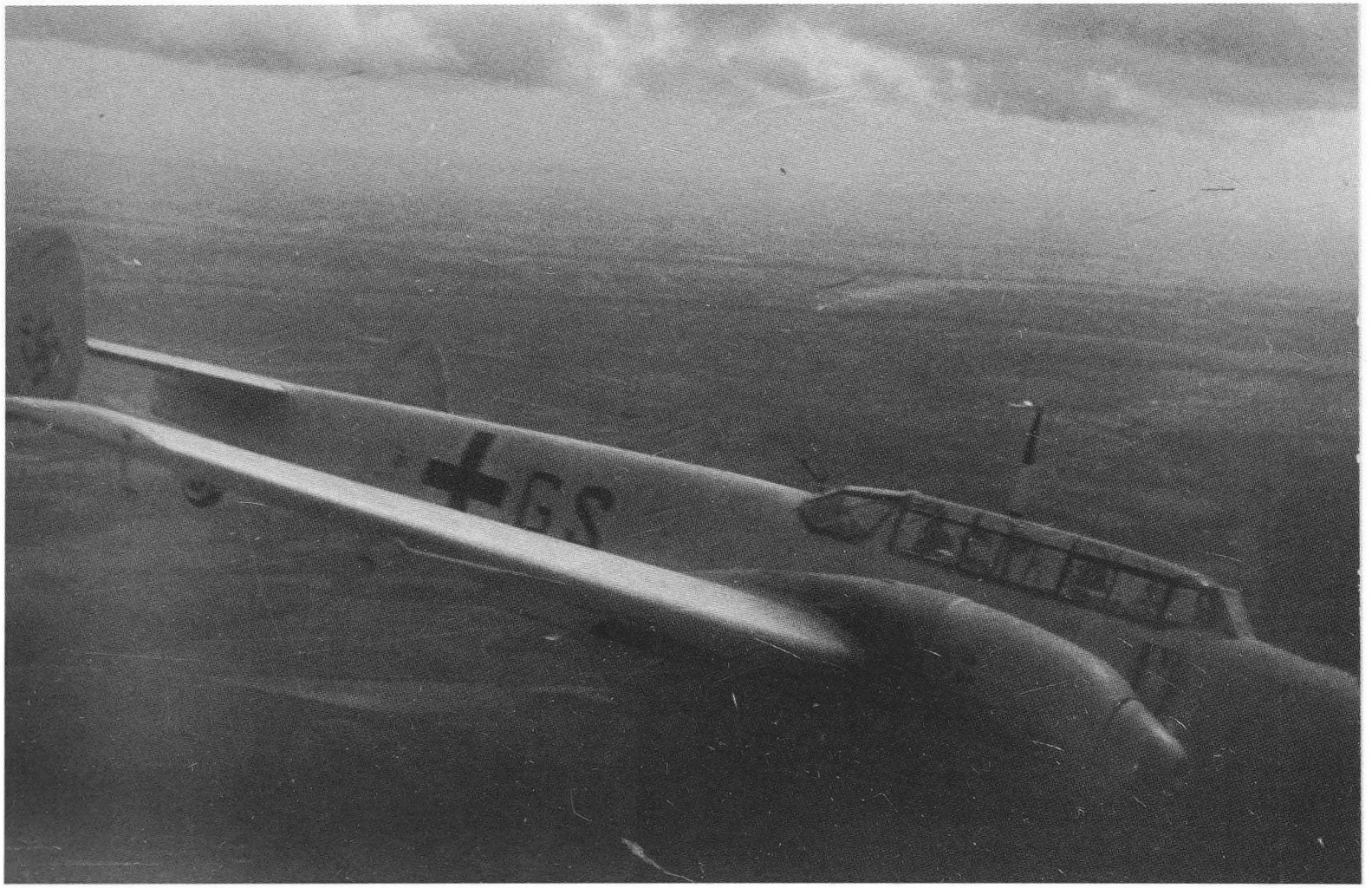
Italy's *Regia Aeronautica* (air force) played its part in prosecuting the Axis Campaign in the air throughout the Mediterranean. The fighter in the foreground is a Fiat G-50, whose overall performance was a match for most RAF fighters up to mid-1942, when the Mk. V Spitfire made its appearance in numbers. Its Luftwaffe partner is a Bf 110E complete with 900-liter external tanks.

A pair of Bf 110s are photographed flying a rather loose echelon formation over the strongly sunlit Mediterranean waters. Both are E-2 variants with the fuselage extension that houses a crew dinghy. The basic light color bears a darker top-fuselage strip with *Sandgelb* (sand-yellow) blotches. The absence of external fuel tanks suggests the flight is non-operational.

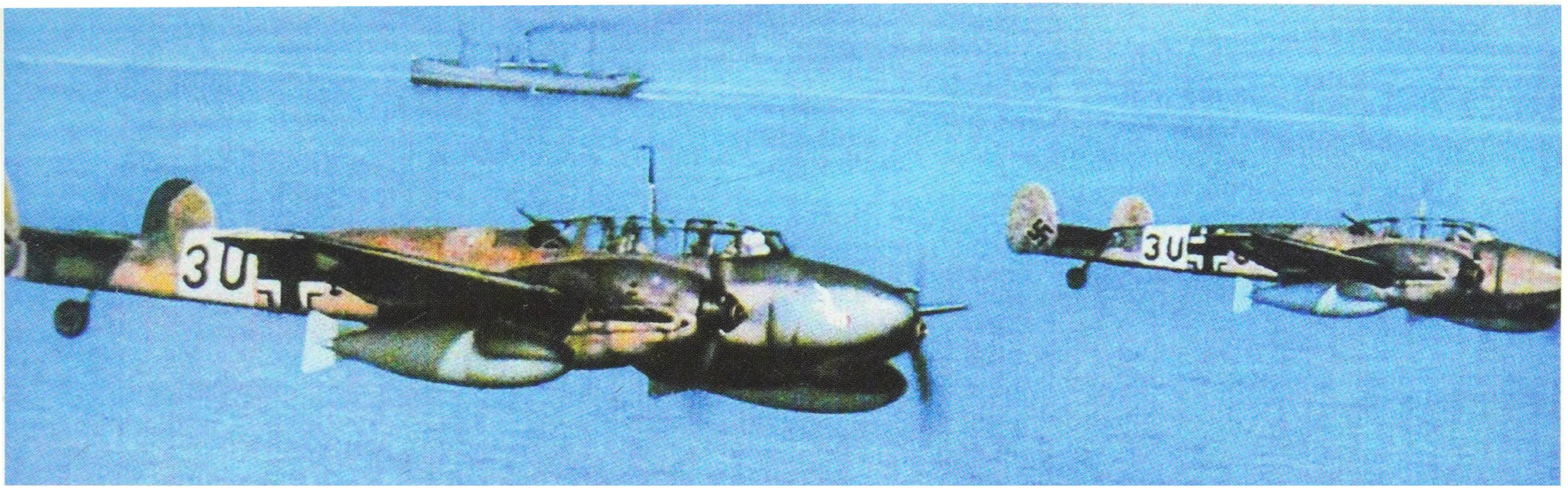




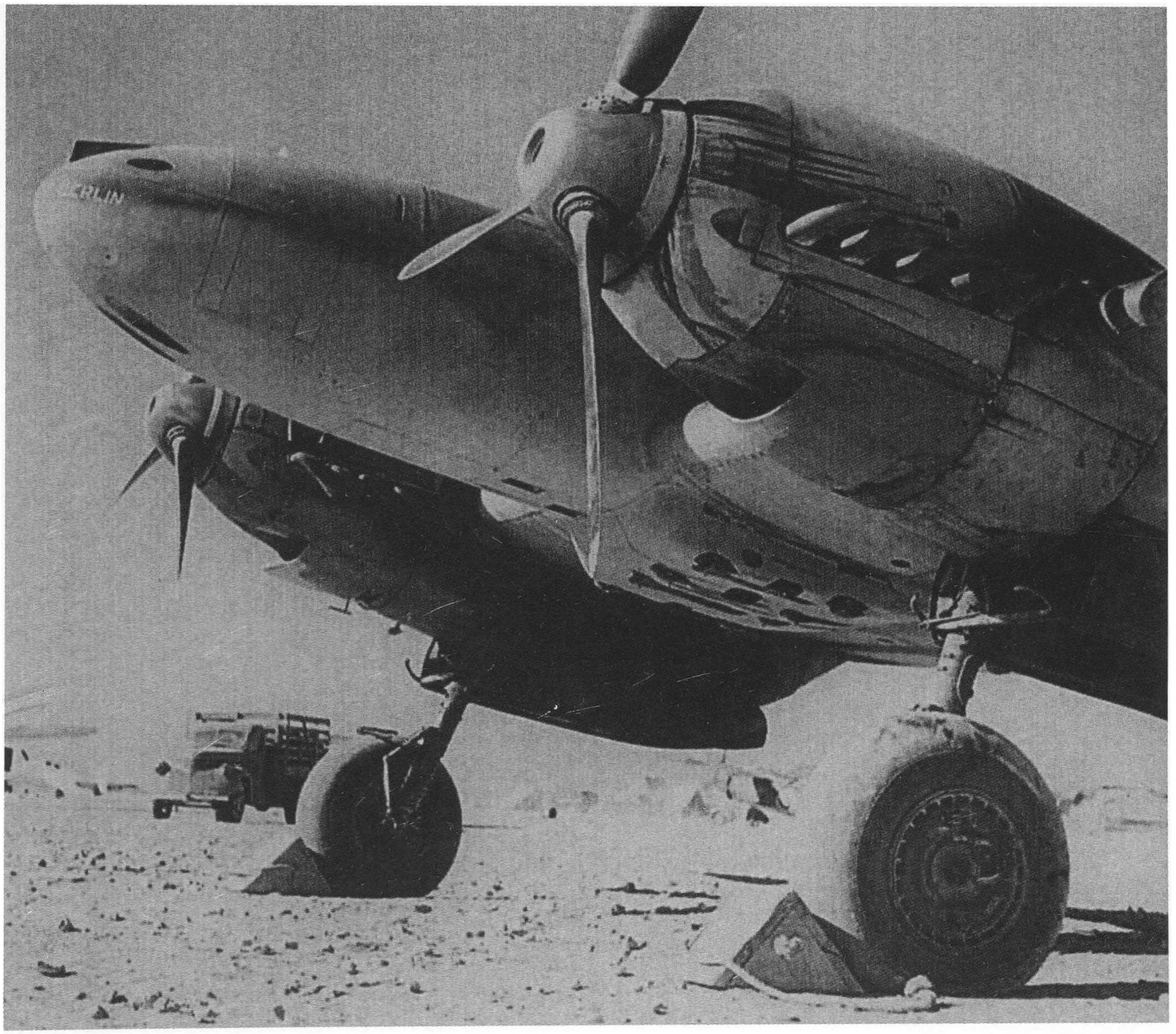
The *Englandblitz* emblem under the cockpit confirms this Bf 110E's function as a night fighter, but little else. The lack of radar aerials indicates its presence during the initial stages of the nocturnal battle with the RAF bombers between 1940 and 1942. The camouflage pattern is one not often seen on *Nachtjagd* aircraft.



The Luftwaffe's search for a camouflage scheme that would render its night fighters difficult for an adversary to pick out in time to take evasive action is exemplified by this trial test conducted on Bf 110E-2/3C+GS, serving with *NJG 4*. The bland overall application was however not adopted to any degree until the final stage of World War II, with most *Nachtjagd* aircraft manifesting some form of darker top-surface colors, although not so prominent as those applied to daylight-operating units.



The crew of this Axis freighter sailing in ballast, to judge by the high waterline, would be very appreciative of the escort cover provided by two Bf 110Es from *9./ZG 26*. The casualty rate among the enemy merchant crews was consistently high during the latter stages of the North African Campaign, this despite the air cover being provided.

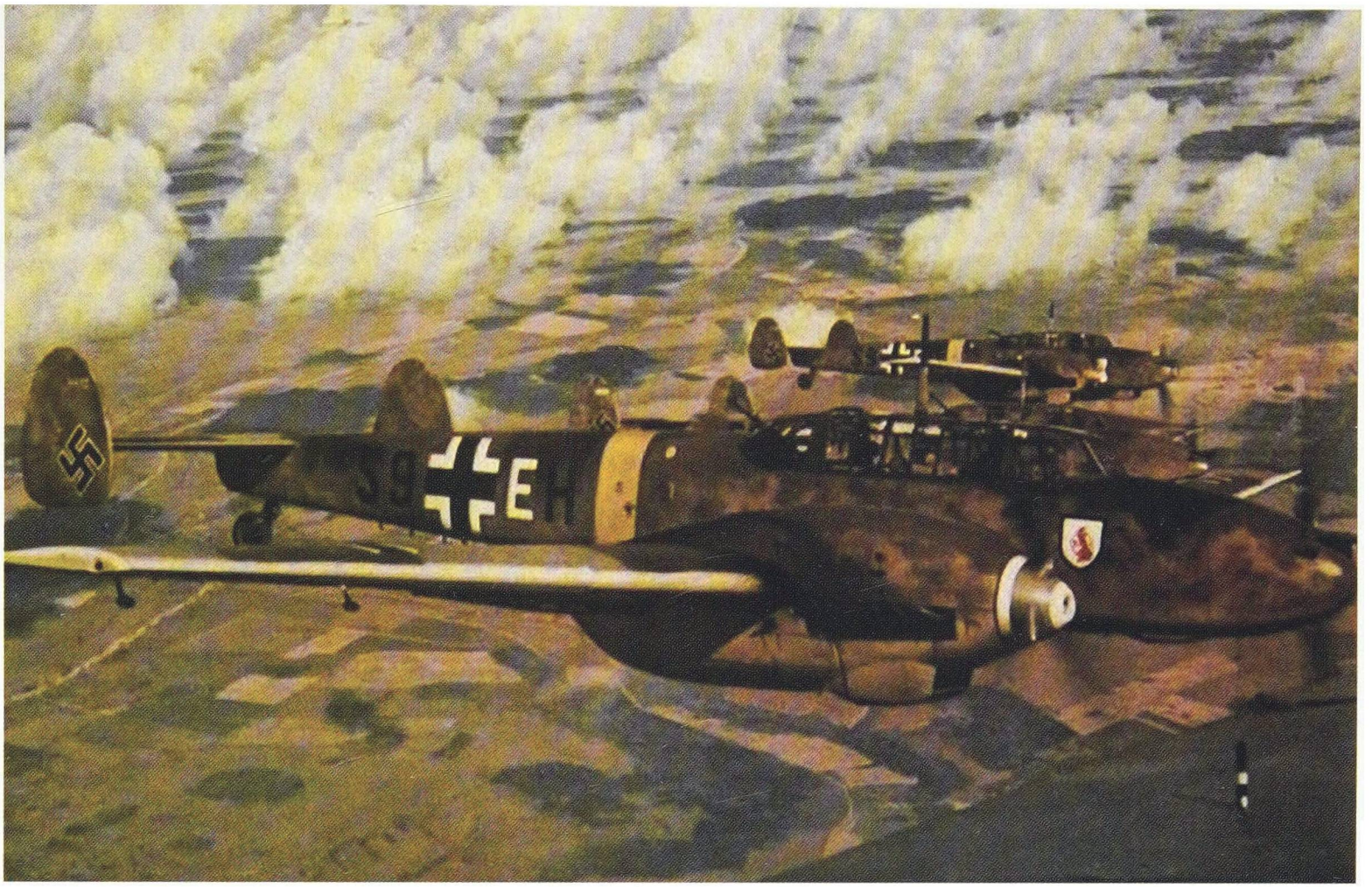


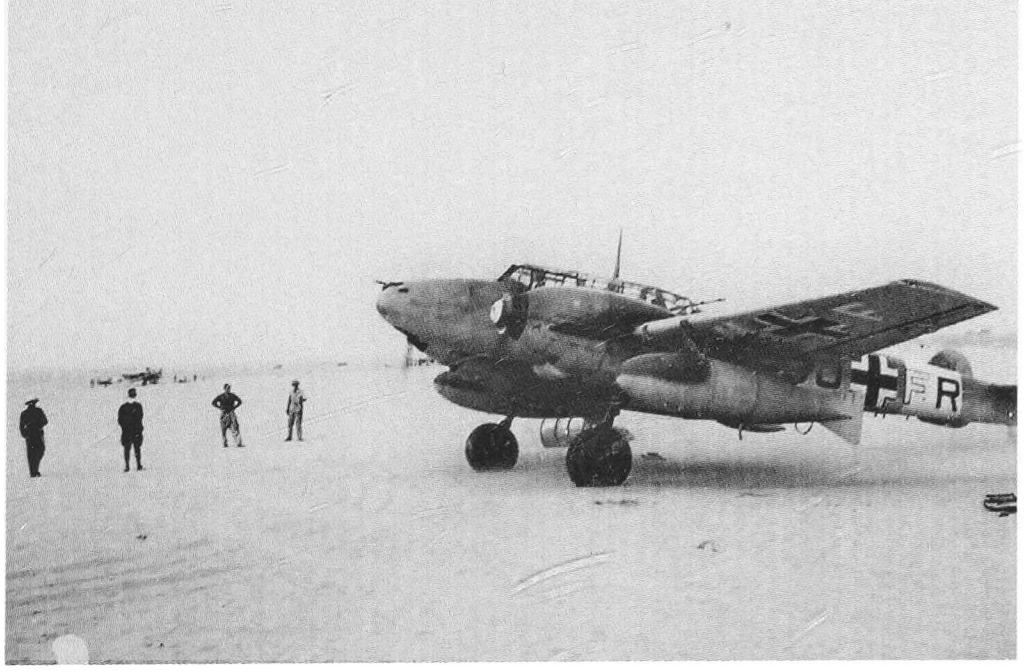
The latest 8th Army advance across North Africa has caught this Bf 110E-1 minus all nose-mounted guns, abandoned in seemingly intact form on its airfield, and whose title "Belle of Berlin" adorns its nose. The ventral tray is an R2 adaptation that permits the aircraft to carry two SC1000 bombs at the marginal cost of deleting the ETC50 underwing racks that accommodated a maximum of 100 kg in small bombs.

The solar-topee sun helmets seen in the foreground confirm that the barren surroundings to a trio of *III./ZG 26* Bf 110s are North African in origin. The faintly discernible "N" letter on the nearside engine cowling denotes the power plant as the DB601 variant, which along with the air scoop on the nose relates to a Bf 110E. Wing bomb racks are supporting a duo of SC25s. Lack of an air scoop on the center fighter indicates it is a Bf 110C or D. Airman on left wears the vertical-rib-pattern life vest.

The upper-nose compartment's detachment will allow the mechanic access to the MG17 gun battery on a Bf 110E-2. The codes relate to *Aufklareungsgruppe 33*, whose primary mission during 1941, was to execute long-range reconnaissance sorties over Russia. The aircraft's normal dark camouflage has been oversprayed to present a far more indistinct outline. Note the rear fuselage extension and twin ETC50 bomb racks below the wings.

A Bf 110E trio of aircraft adopt a port-echelon formation to the photographer's machine. They belong to *Schnellkampf-geschwader* (*SKG*) *210* and were then based on the Russian Front, as confirmed by the yellow fuselage bands. The emblem on the nose of the *1. Staffel* aircraft in the foreground is a map of Great Britain, upon which a gunsight frame is focused. Mottled fuselage camouflage contrasts with the tail and wing surface bands.

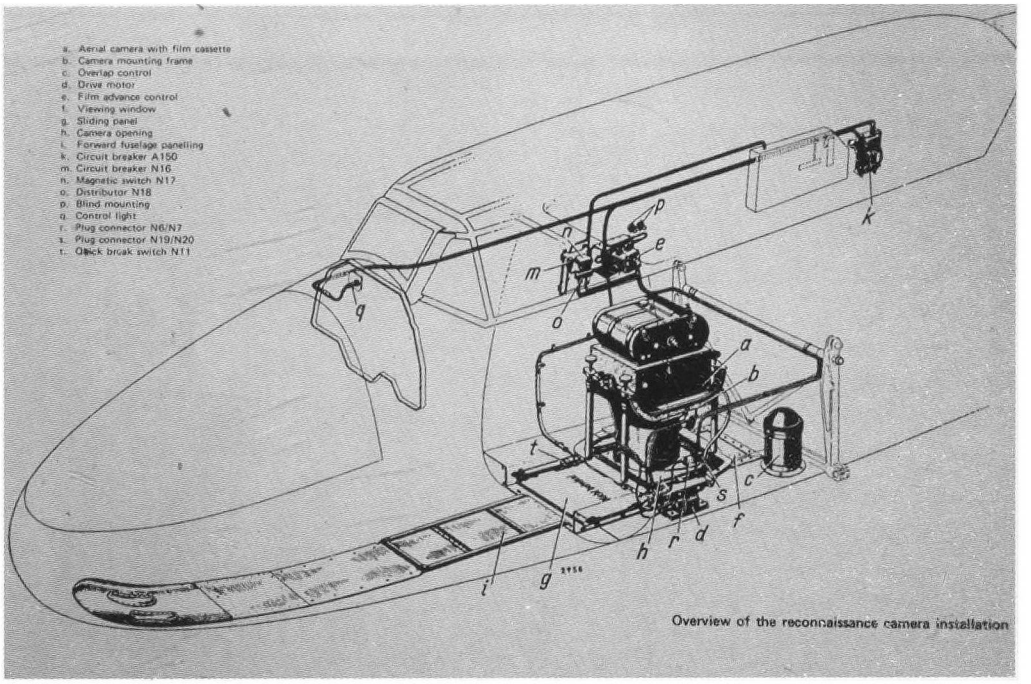




The largely barren wastes of the North African landscape are evident in this shot of a Bf 110E serving with I*II./ZG 26* and with the engines revved-up ready to move off for a sortie. The extremely gritty nature of the ground inevitably played havoc with the precisely honed and therefore vulnerable mechanisms of the aircraft.

The transformation of a Bf 110E from Luftwaffe to Iraqi air force markings is complete. The *II./ZG 76* aircraft with the *Gruppe*'s shark mouth design bears the Arab country's red/white/green national insignia colors on the fin, along with a black-edged green triangle on the fuselage. The white upper-nose panel, yellow engine cowling, and propeller spinner tip and the camouflage separation line on the external fuel tank add to the very colorful image.

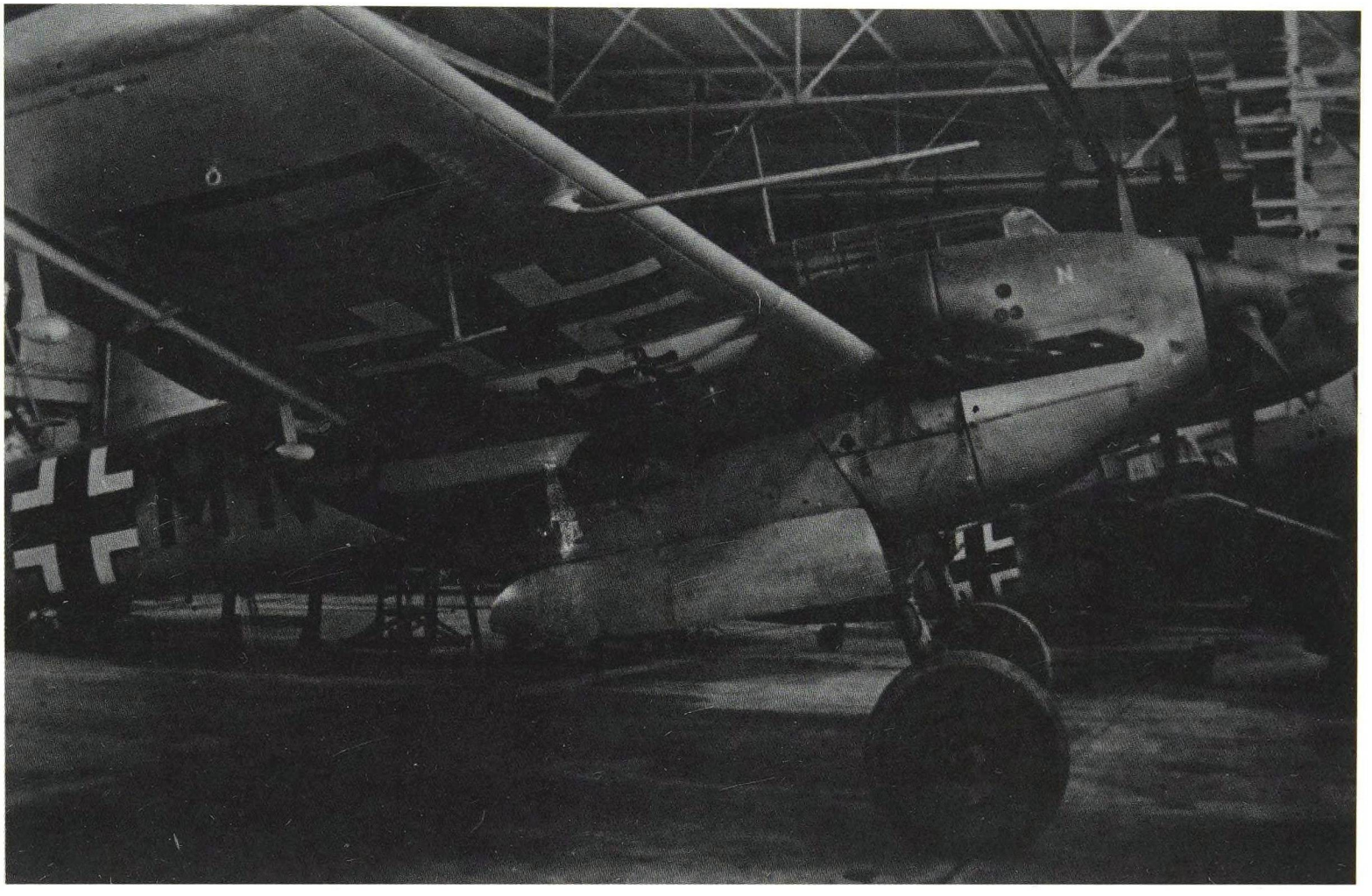
The officer posed in the picture above is Johann Schalk, who is seen here bearing the rank of *Oberstleutnant* and serving as *Kommodore* of *ZG 26* during 1941; the *Geschwader's II.* and *III. Gruppen* were then operating first in the Balkans and then on the Eastern Front. As a *Hauptmann*, Schalk had led *III. Gruppe* during the Battle of Britain. The picture at right catches him as he is about to enter the cockpit of a Bf 110E. Note the revised position for the *Stab* chevron and horizontal bar, which would normally be located ahead of the fuselage *Balkenkreuz*.



Overview of the reconnaissance camera installation

The use of the Bf 110 as a reconnaissance platform commenced with the C-5 and C-5/N variants. The function was then taken up with the E-3 but with the extended-range addition of 900-liter external fuel tanks. In all cases the reconnaissance function required the deletion of the ventral cannon in order to accommodate the sliding panels that provided the operating access for the camera lens.

The Bf 110E was the second *Zerstörer* variant to be equipped with the DB601N, as the letter applied to the starboard engine cowling indicates. The angle view of the wing undersurface picks out the ETC50 pair of bomb racks and the lengthy pitot mast. Although the nose scoop, which further identifies the E series, is not visible, the wing racks were reportedly not mounted on the earlier C-4, 5, and 7 production airframes bearing the DB601N. The MN letters could be either part of a factory code or relate to a *5. Staffel* operational fighter.



The radio operator / gunner on the *Zerstörer* was initially armed with a single machine gun of 7.92 mm caliber, as seen in this photograph. Counterattack from a rear quarter was obviously not regularly anticipated when World War II commenced, but from 1940 onward the ability to defend his aircraft effectively was mortally threatened. Even the belated introduction of the MG81Z on the G-series airframes proved a barely adequate response to the multigun batteries on most Allied fighters.

CHAPTER 7

Bf 110F

The penultimate Bf 110 model, which commenced rolling off the production lines and entered Luftwaffe service during 1941, was the F, a variant that would see the last airframe being turned out during 1943. On August 15, 1941, a major change occurred within the aircraft industry when *Gen.* Erhard Milch instituted the Ring Organisation. Thirteen firms were selected as central controllers, their brief being to liaise with linked companies providing assembly and component construction facilities. In Messerschmitt's case, it oversaw AGO, Arado, Erla, Gotha (*Gothar Waggonfabrik*), MIAG, and WNF in terms of assembly, with Fiesler the source for component production.

The production effort for the Bf 110F would initially involve MIAG (based at Braunschsweig) and GWF (at Gotha), a total of 580 airframes being involved. Power was provided by the DB601F, rated at 1,350 hp in respect of all but the F-4, which would introduce the DB605 into service. An armament refinement was the provision of detachable sheaths to protect the barrels on the nose-mounted MG17s.

The F-1 was the first operational production version that bore a distinct similarly to its E-1 predecessor, followed by the F-2, which was specifically allotted a bomber-destroyer role. To the standard armament was added the *Werfergranate* (*Wr.Gr.*) 21. This was a 21 cm spin-stabilized rocket intended to be launched from underwing tubes mounted in pairs. Its presence provided a theoretically fearsome weight of additional striking power. Should even one of the rockets make contact with a bomber airframe, it was likely to create a devastating degree of damage. Problems with assessing the precise range at which to discharge the time-fused rockets (whose maximum lethal radius was 55 m) would result in a notably diminished kill rate, but the psychological effect on the USAAF crews, who formed the primary target during 1943 and into early 1944, could not be so easily dismissed.

As with the E-1/F-1 layout similarity, the same relationship existed between the E-3 and F-3, since both were assigned a reconnaissance role. The armament content was the same as with the MG/FF cannon, detached in order to permit the RB50/30 camera unrestricted shutter access via the cockpit floor. Four MG17s up front and two in the rear cockpit were installed.

To date, no Bf 110 variant had been comprehensively assigned to a specific *Nachtjagd* role, but the predecessor to the Bf 110G-4–customized night fighter now arrived in the form of the Bf 110F-4. To the pilot / rear gunner crew was added a crew member who would man the onboard radar set; his presence in turn freed the gunner from the extra duty of *Bordfunker* (radio operator). The final engine design from Daimler-Benz utilized by the F-4 took the form of the DB605. The increased torque effect of the engine's 1,475 hp merited the replacement of the rudder by an expanded version. In addition the rudder trim tab was expanded in length and breadth. Production of the F-4 was continued in parallel with the G-4 until the beginning of 1943, and many were configured to carry the *Lichtenstein BC* and *C1* radar equipment. Speed performance, already reduced by the external aerial arrays, was further affected by the addition of large engine-exhaust flame dampers. This was not so inhibiting when confronted by the more pedestrian RAF twin-engine aircraft such as the Whitley or even the Wellington; more critical was making contact with the second-generation aircraft such as the Halifax and especially the Lancaster, with enhanced performance capability.

Up to mid-1943, the *Nachtjagd* aircrafts' offensive firepower was totally nose mounted, but the introduction of twin cannon-caliber weapons placed in the rear cockpit of the Bf 110 and on the spines of Ju 88Gs provided a method of almost undetectable approach from below upon a bomber, as well as granting a usually lethal striking force with the prey outlined in plan form. A small number of F-4 airframes were reportedly involved in this reconfiguration, which bore the title *schräge-Musik* ("jazz music").

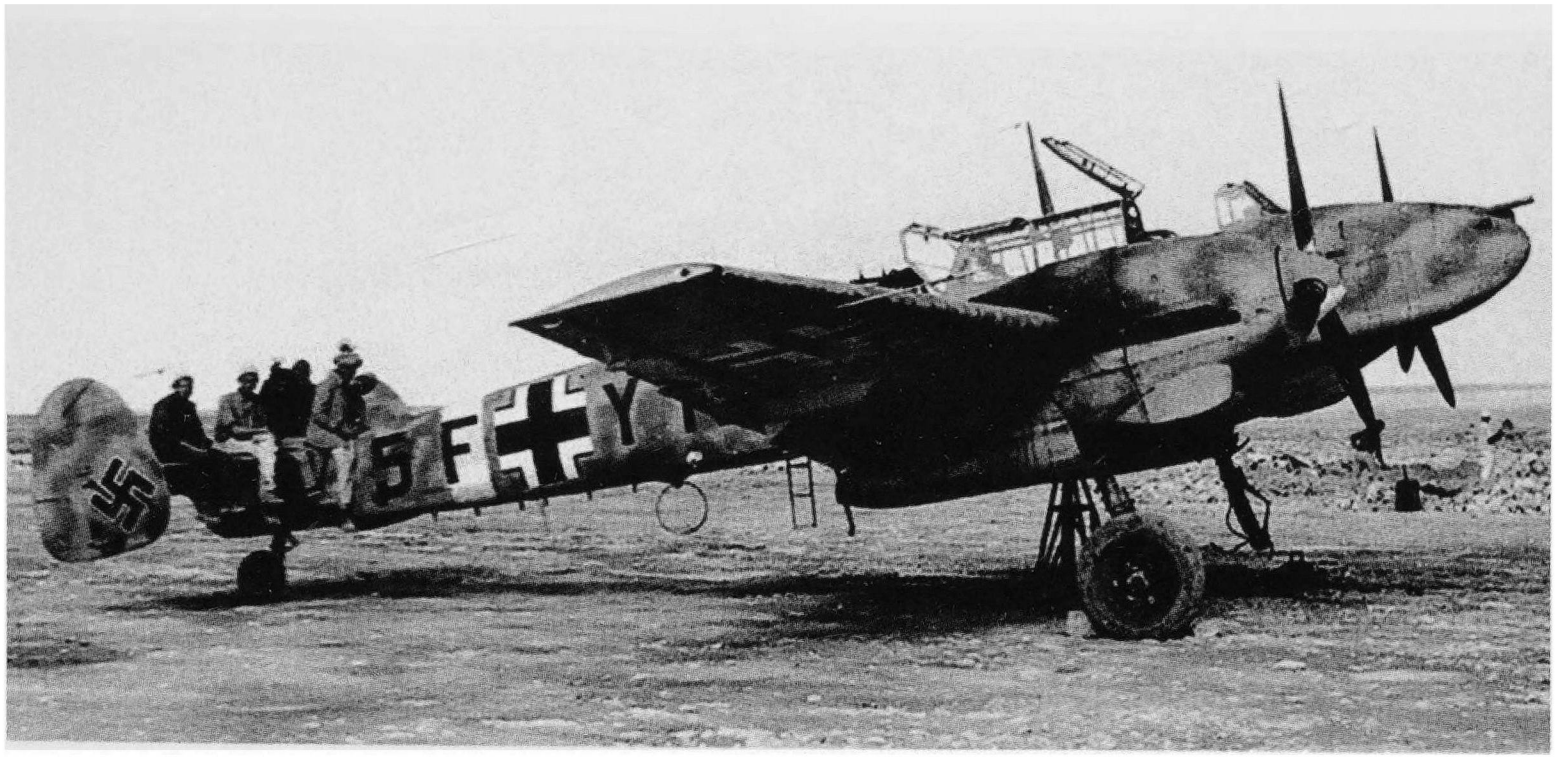
Bf 110F 5F+YK is an aircraft assigned to *2./(F)14.* The F refers to a *Fernaufklärungs* (long-range reconnaissance) role. The provision of drop tanks under the wings confirms the *Staffel*'s primary function. Note the tropical filter unit located on the wing leading edge, outboard of the DB601 engine.

The introduction into service of the DB601F engine with a power rating of 1,350 hp was a feature on the bulk of Bf 110F airframes. An external variation with previous DB601-series engines was the deep rectangular oil cooler cover. As with the Bf 110E-3, the F-3 seen here has an Rb50/30 camera with sliding covers mounted under the central fuselage. The standard pair of 20 mm MG-FF cannon were deleted both on the E-3 and F-3. The running of the starboard engine casts up a dust storm from the arid North African landscape.

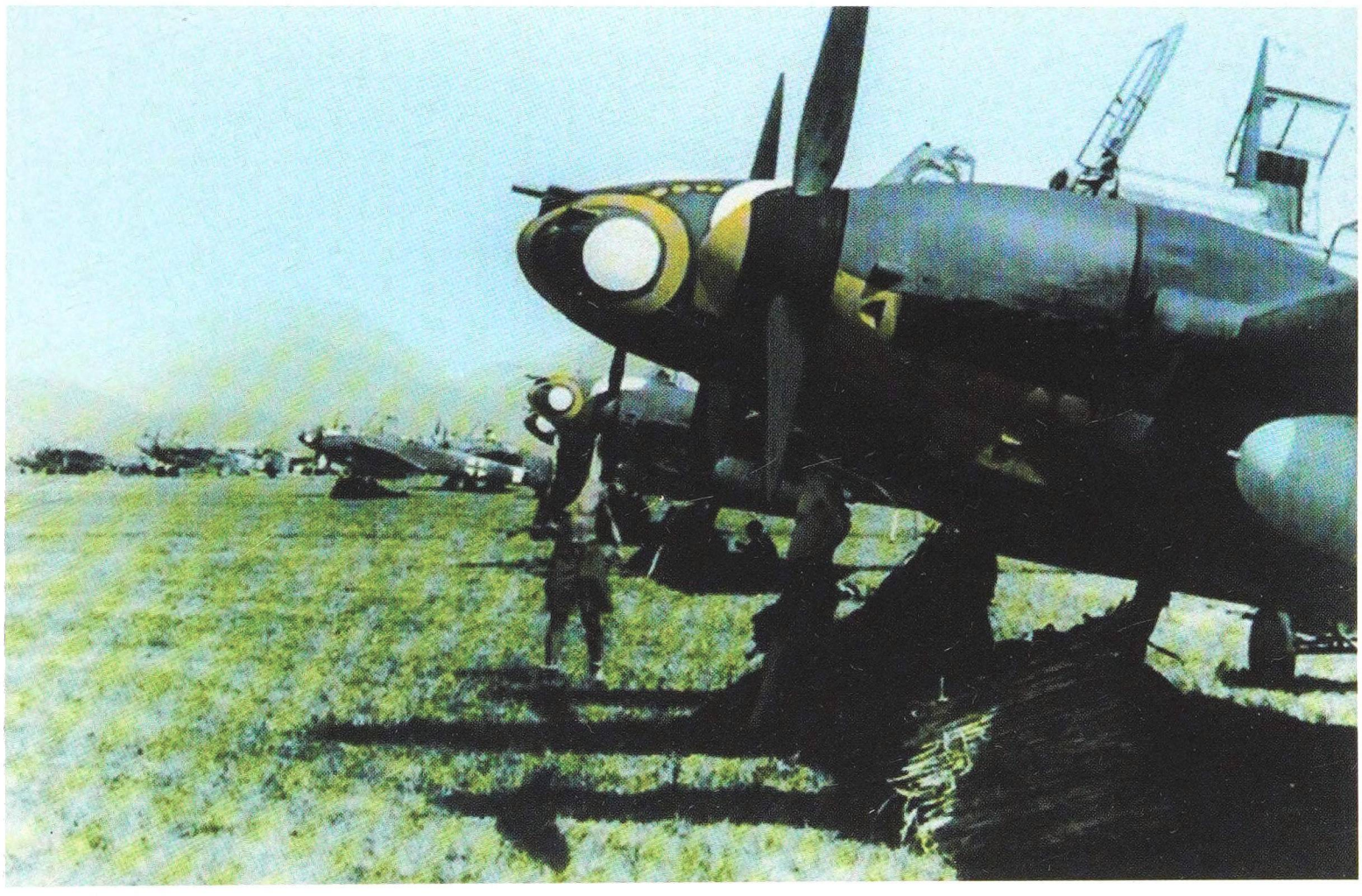
Both *I.* and *II./ZG 26* shared duties on the Eastern Front, from *Barbarossa*'s inception on June 22, 1941, until early 1942, when the former-named unit was disbanded. The clog design is applied to this Bf 110F's engine nacelle; the rear fuselage behind the tail wheel is reduced in area. Its companion is either a D-3 or E-2 variant with an extended rear fuselage that houses a dinghy.

A Bf 110F-3 casts up an inevitable North African sandstorm as the pilot open the throttles to move out of the dispersal. The aircraft belongs to *2./(H)Aufkl.Gr. 14 (Pz). Nahaufklärergruppen* (short-range reconnaissance units) sorties were linked with the Wehrmacht, and *(H)* was a reference to this *Gruppe* functioning on behalf of a Korps and Armored Division.

The starboard stabilizer surface on 5F+YK forms a seat for four individuals. Their dusky appearance and seemingly civilian clothing indicate they are either North African in origin or could be previously captured personnel from an Indian regiment serving as part of the British 8th Army, which had been caught up and isolated in the ever-mobile nature of the desert campaign.



A line-up of *II./ZG 1* Bf 110s is snapped in what is believed to be during the unit's operational period based in Italy to judge by the high geographic background. The change in rear cockpit access to one featuring a side-hinged access was made on the F-4 variant. This is confirmed by the DB605D engines as well as the nose-mounted machine guns and large air scoop; both of the latter features giving way to cannon-caliber armament and a camera-gun respectively on the Bf 110G.



The dust-laden North African desert was the last place in which to handle delicate equipment such as this camera destined for installation in a Bf 110F-3; the workbench typified the lack of official support facilities within the theater of operations, which the ground crew overcame so adeptly. Airman on the port wing surface is straddling the tropical filter cover. Note how the aircraft bears a heavily mottled camouflage pattern.

The extremely delicate nature of a camera's mechanism demanded its careful handling in the dust-laden North African soil. Two ground crew, having set the equipment up, are now carrying the specialist unit to the waiting Bf 110E-3 that will complete the reconnaissance sortie. Note the large stones used as a very crude block against the landing gear, and the black/white segmented propeller spinner covers.

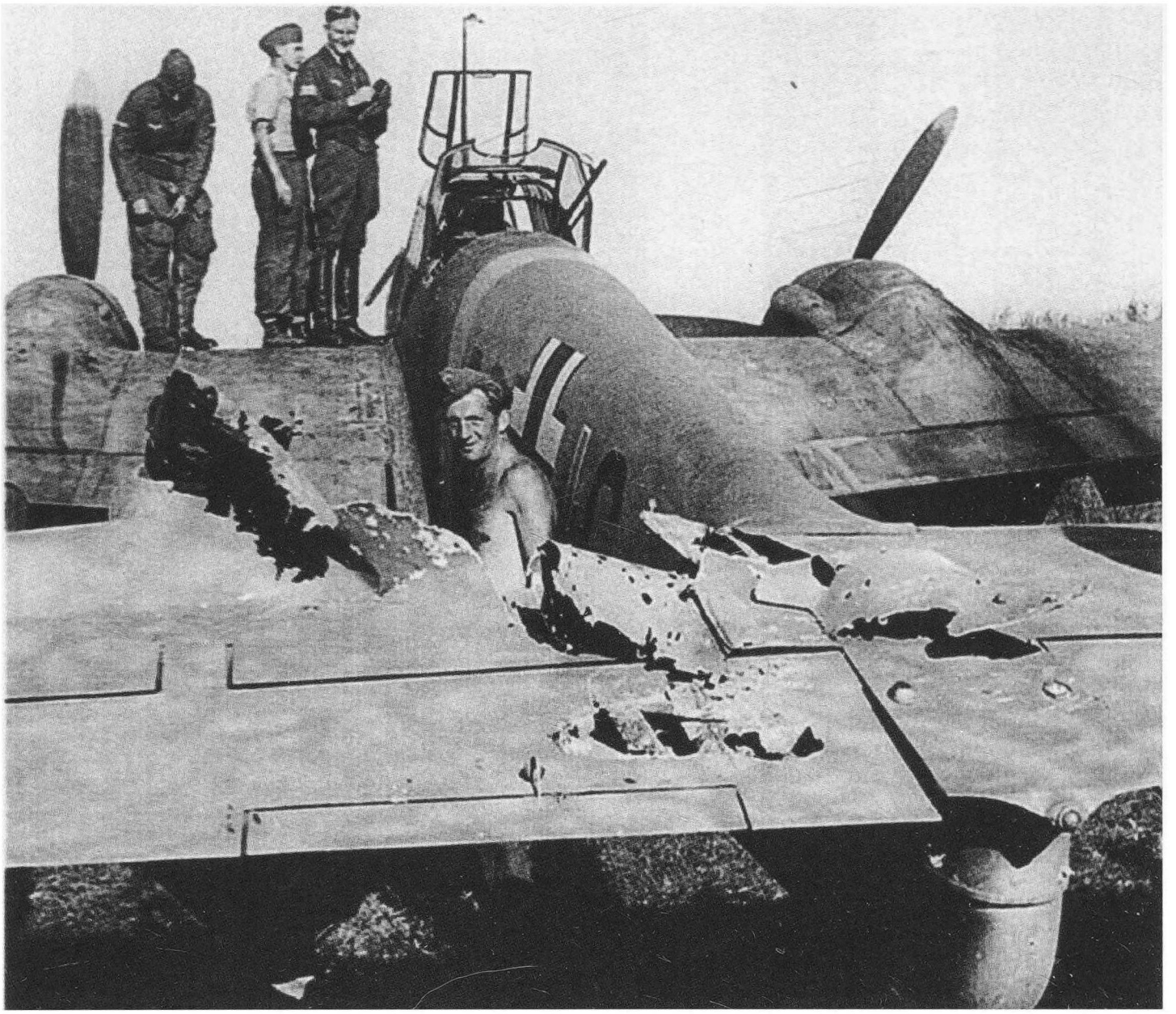
The close-up of a Bf 110F-4 assigned to *9./NJG 2* demonstrates the specific aerial layout of the initial *Lichtenstein BC* (FuG202) system's array. The four horizontal poles have X-pattern ends that in turn support the slim, vertically aligned aerials. The solid-fronted propeller spinner covers confirm that the engines are the DB605, first introduced on this variant and destined to power the Bf 110G series. Note the heavy camouflage botches on the fuselage.

The black coveralls worn by these two ground crew members led to the personnel being christened *Schwartzer-maenner* (black men), one that they bore with justified pride; the short-length boots were also a regular-issue item for these airmen. Individual on the left is working alongside the exposed oil cooler drum. As with the Allied air forces, support staff such as these still receive little recognition in terms of literary coverage for their vital work, which ensured that the aircraft were regarded as operationally airworthy by the aircrews taking them into combat.

The Bf 110F-3 in common with its E-3 predecessor was utilized for reconnaissance purposes. The North African landscape forms the background for an F-3 serving in a *Fernaufklärungs* (long-range reconnaissance) role. The *Halbkettenfahrtzeug* (half-track vehicle) seen here was widely used by the German military both for armored and soft-skinned transport designs during World War II.

The final offering from Daimler-Benz in relation to the Bf 110 was the DB605, with an output of 1,475 hp, which was the power plant for the F-4 variant. The spinner cover was expanded in diameter and was totally enclosed, as compared to most or all previous Bf 110s, which had a central air duct. A *ZG 1* fighter coded S9+DH has both engines wound up to full power as it sits on what is a typical airfield somewhere in Russia.

The first Bf 110 model to switch from the DB601 series to the DB605, with a power rating of 1,475 hp, was the F-4. The engine outline was somewhat more streamlined, with a deeper oil-cooler cover, while the VDM propeller spinner cover dispensed with the large central aperture mounted on the earlier units. The fighter in question belongs to *JG 5*'s *Dackelstaffel*, as denoted by the artwork of a dachshund seizing a Soviet aircraft in its jaws.



The crew of this Bf 110F are standing by the cockpit following what must have been a harrowing return flight to their airfield; they were very fortunate that the severe damage inflicted on the fighter's forward left stabilizer did not result in its collapse on the way back to Nicolayev in the Soviet Union. Date of the incident was March 16, 1943.

The presence of three crew as well as the layout of the cockpit canopy are indications this is a Bf 110F-4, the first *Zerstörer* variant to be regularly assigned an extra member. The F-4 was a dedicated night fighter, and the mottled camouflage with a scribble pattern added in is a further pointer toward its nocturnal function. The gunner's weaponry is doubled up, but his cheery demeanor is based on some other matter.

CHAPTER 8

Bf 110G-2/G-3

Bf 110G-2

The introduction of the DB605 on the Bf 110F-4 airframes followed Willy Messerschmitt's original recommendation prior to this variant entering service. This request had (perhaps naturally) been refused at the time by the RLM on the assumption that the Bf 110's intended replacement—the Me 210—was to be granted priority for the engine's deployment. The nascent design's subsequent operational limitations, in the face of Messerschmitt's natural assurance that it would successfully pass through its development program, accordingly left the RLM with little option but to continue with the Bf 110 design in its G-suffixed format (ironically, the staccato progress toward the DB605's ultimately efficient function had seen the Me 210 equipped with the DB601F).

The initial batch of G-0 airframes were not original in construction, being in fact F airframes, whose layout was compatible in nearly every aspect. One important amendment involved the introduction of the extended-length Flettner rudder trim tabs; these were deemed necessary in order to counteract the severe control forces in the event of a power failure of the port engine. The chosen DB605B power source was currently displaying worrying problems, which included a poor supercharger intake layout and indifferently functioning coolant radiators and fuel pumps.

Production had begun in December 1942, but the still-recurrent range of DB605B deficiencies caused units receiving the initial batch of aircraft to "ground" many. It took a series of tests at Rechlin to sort out the manifold issues:

(1) Loss of oil pressure/overheating—centrifugal oil de-aerators placed in the lubricating circuits on either side of the engine block.
(2) Piston damage / excessive knocking—chrome plating of the exhaust valve heads.
(3) Crankshaft breakage—larger crankcases installed.
(4) Ignition wiring overheating—engine-cowling frontal air scoops for spark plug and ignition-wiring cooling.

G-Series Variants

Three subtypes were envisaged: (1) G-2 day fighter, (2) G-3 reconnaissance, and (3) G-4 night fighter.

The intended use of the Bf 110G-1 as a *Jagdbomber* (fighter-bomber) never did reach fruition, but the G-2 in contrast evolved into a fully fledged day fighter. The MG17 quartet of machine guns was backed by the ventral pair of cannon-caliber weapons, but the original MG/FF guns were now supplanted by MG151/20s. The rear gunner's weapons were similarly changed from MG17s to MG81Zs, although the latter were still 7.92 mm in caliber.

The year 1943 witnessed the burgeoning menace of the USAAF bomber offensive as the force's steady progress into the Third Reich's hinterland expanded, creating a converse expansion in *Reichsverteidigung* countermeasures. The absence of an effective Allied escort force once the B-17s and B-24s had crossed into Germany proper permitted the unfettered deployment of twin-engine fighters in challenging their progress. The increasingly heavier armament of the Bf 110 and its extended range capability were twin factors that enabled it to pose a supplementary threat along with its single-engine Fw 190 and Bf 109 cousins.

The G-2 underwent a series of *Ruest-Saetz* modifications, beginning with what was currently the largest-caliber weapon yet to be borne aloft; this was the 37 mm Flak 18 cannon (R1), ventrally located in a bulky pannier. A blast-protection panel was fitted directly above the forward barrel length. The R2 modification was passive in nature, since it involved the insertion of the GM1 nitrous-oxide boost system within the DB605 engines. Although 150 G-2 and G-3 airframes were considered for modification, only a handful were actually configured, with *ZG 76* the sole operator, and then only in early 1944.

The next modification to be made (R3) increased the striking power of the standard nose-mounted armament. The service introduction of the Rheinmetall AG's 30 mm Mk. 108 cannon saw the twin-linked weapon displacing the MG17 machine guns. Now the presence of four cannon-caliber weapons presented a formidable if not insupportable challenge to a target's chances of surviving such a fusillade—that is, providing the Bf 110s could gain contact with unescorted bomber formations. R4 modifications simply involved the addition of the R2 nitrous-oxide engine boost system to the R3-equipped Bf 110G-2s.

The final pair of R-prefixed adaptations began with the R-5; this took the form of retrofitting the Bf 110G/R1 with the Mk. 108 cannon in place of the MG17s and resurrecting the 37 mm Flak 18. R-6 was an extension of the GM1 nitrous-oxide boost system to selected aircraft, which unlike their R2 contemporaries were to be specifically tasked with carrying out high-altitude operations, presumably with Allied photographic-reconnaissance aircraft interceptions in mind.

Summer and autumn of 1943 involved the 8th Bomber Command in its most sustained series of deep penetrations over the Third Reich, during which time the bombers were still bereft of long-range escort cover. During that period, the Bf 110G-2 was employed regularly against the *Viermots* (four-engine aircraft). Strangely, the August 17 Regensburg-Schweinfurt mission involved Bf 110G-4 units alone, but it was the G-2 that provided the majority of sorties during the autumn period, even as the 8th Fighter Command's P-47s and P-38s began to arrive in numbers, as well as expanding its range in the former design's case.

All too soon, the performance limitations of the *Zerstörer* began to unfold, the presence of external excrescences such as the weapon panniers or the *Wr.Gr.* 21 tubes adding to the crews' woes when often vainly attempting to evade interception. In spite of a mounting loss scale with multiple casualties during specific sorties, the Luftwaffe hierarchy persisted in maintaining the Bf 110G-2 *Gruppen* on daylight operations well into 1944—by which stage the P-51 Mustang was adding even more to their casualty rates. (In a return to 1940 operational circumstances, the Bf 110G-2s were sometimes paired with Bf 109 or Fw 190 escorts in what were bids, not always achieved, to protect them from what was now a numerically, and technically, superior USAAF fighter presence over central Europe.)

Bf 110G-3

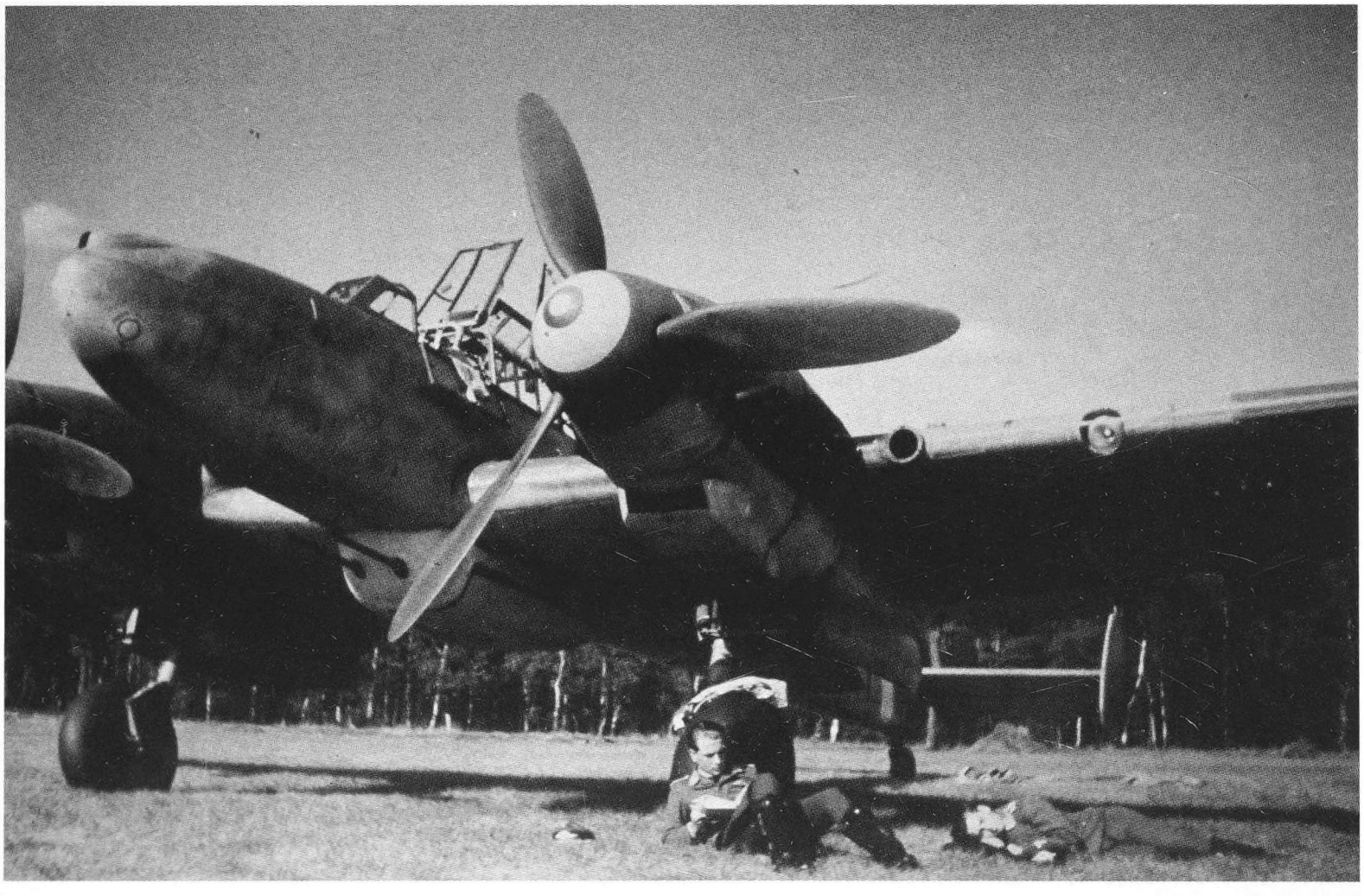
The Bf 110G-2 and G-4 have dominated the myriad accounts of Luftwaffe operations. Very little has been written about the interim Bf 110G model, the G-3, whose intended role of reconnaissance operations admittedly did not extend far beyond their assignment to the duty, during which time RB50/30 and 75/30 cameras were carried. However, the introduction both of the Ju 88 and Me 410 on the same type of operations ended with the *Zerstörer* units being stood down. A sizeable proportion out of their numbers were brought up to the normal G-2 armament scale—whether with both the installation of the 20 mm MG151/20 cannon in the lower fuselage and the Mk. 108 replacements for the MG17s remains unclear.

A forward-angle view of a Bf 110G-2 affords a view of the twin sets of underwing tubes accommodating 21 cm *Werfergranate* rockets. The standard nose-mounted armament commenced with four MG17 machine guns and two MG151/20 cannon, the latter displacing the MG-FF cannon previously applied to the Bf 110. A further offensive measure seen here is a fuselage gun pack bearing two MG151/20 cannon. The external equipment further reduced the aircraft's overall performance, making it rather easy prey for Allied fighters.

The Bf 110G was entering service in numbers by 1943 and was deployed in the Mediterranean Theater of Operations (MTO), among other battle zones. The underwing frames hold drop tanks, each with a 300-liter (66-gallon) capacity. The rudder color is probably yellow, a tone indicating service within the MTO.

The then-current *Staffelkapitän* of *7./JG 26* and later *III./ZG 26 Kommandeur*, *Hptm.* Kiel supervises the loading of a spin-stabilized 21 cm *Werfergranate* into one of the twin tubes mounted on the Bf 110G-2's port wing. The veteran of operations beginning over Poland in 1939, he was also a twenty-kill *Experte*. His luck ran out on January 29, 1944—ironically over Kiel—when he was lost during a sortie against an 8th Air Force formation.

The pilot of what is believed to be a Bf 110G-2 is raising one hand to pull the top canopy panel into place. The picture angle illustrates the heavy 57 mm windshield armored glass, as indicated by the solid side frame retaining the vital screen in place. The Bf 110's presence in German skies by 1943–44 placed the design in a steadily more lethal situation as the USAAF fighters began to dominate the skies over the Third Reich.



A crewmember who is probably the pilot casually rests against the landing gear of his Bf 110G-2, with a second stretched out alongside. Any call to action will see the duo along with the third absent member propelling themselves into the cockpit, ready to start up and lift off into the increasingly feral skies over the Third Reich's ill-gotten empire, which was destined to be filled with superior-performance Allied fighters as the Bomber Offensive gathered strength.

The casual manner demonstrated by these crews from *ZG 76* belies the pressures bearing on them as they await the call to action during the summer of 1943. The *Reichsverteidigung* (Home Defense) unit was reformed for this duty during August. Note the extended barrels of the MG151/20 weapons and the spiral bands on the propellers—the latter were not for decoration but were intended to distract the USAAF gunners' attention when making an attacking pass on the B-17s and B-24s.

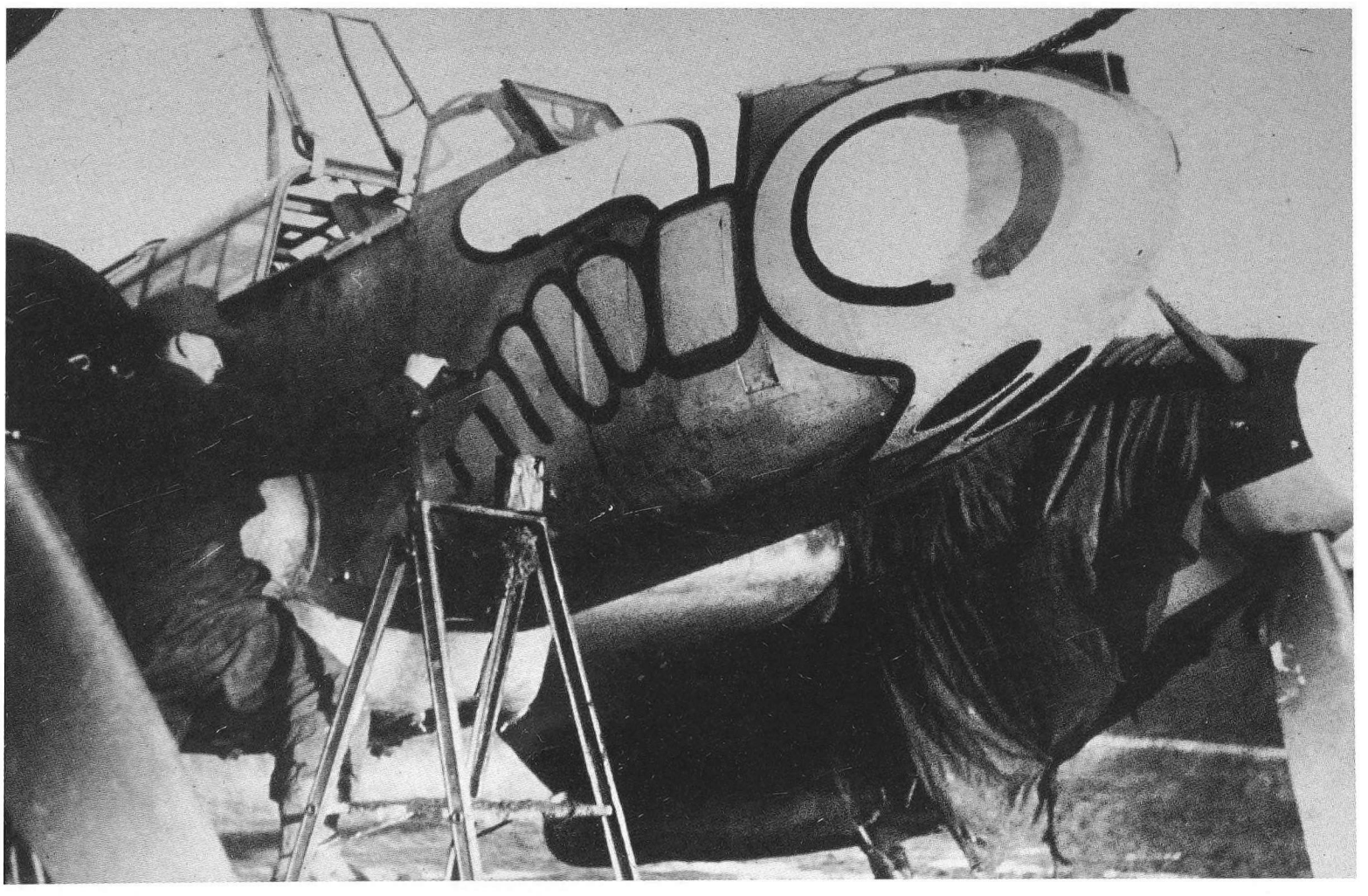
A Bf 110G-2 believed to be assigned to *5./ZG 76* is clearing the airfield perimeter as it heads into action. The heavy nose armament is supplemented by a ventral pack containing a further two MG151/20 cannon. Although a potentially deadly threat to the 8th and 15th USAAF heavy bombers, by late 1943, the steadily extended range of the 8th Fighter Command escorts provided an even more deadly threat to the *Reichsverteidigung* crews' survival prospects.

A trio of Bf 110G-2s assigned to *II./ZG 1* are skirting the massive slopes of what is probably Mount Vesuvius in southern Italy during the unit's brief 1943–44 spell of duties in the region. Regular operations were carried out against the Allied armies' advance through Sicily and onto the Italian mainland.

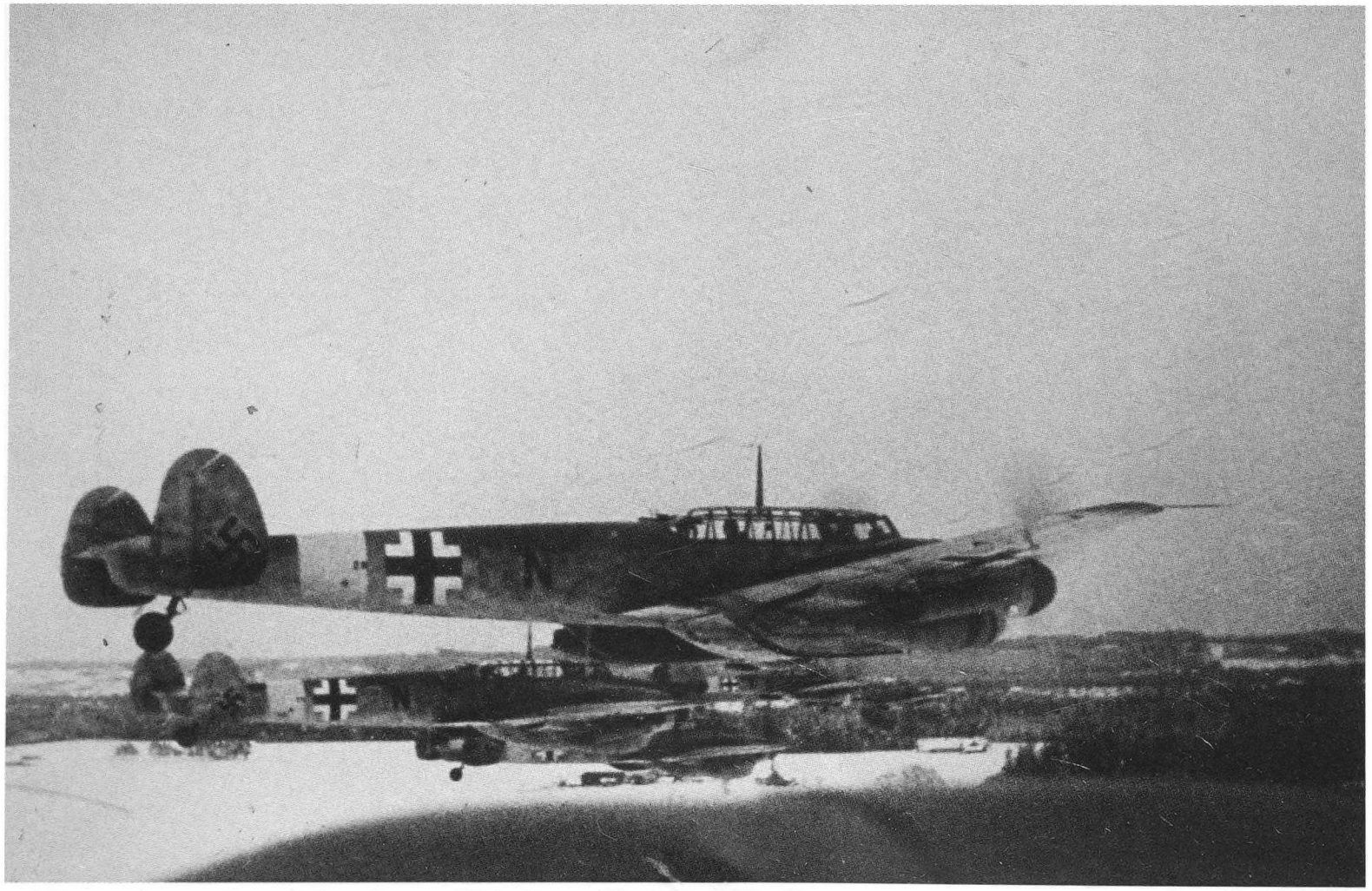
Rows of oil drums are assembled in front of a pair of derelict Bf 110G-2s from *II./ZG 1*. Both airframes lack their DB605 engines and upper-nose covers, while the rearmost machine lacks its complete tailplane. Picture was taken at Montecorvino, close to the Allied landing beaches of Salerno following that event in September 1943, which compelled an Axis retreat northward.

Fuel is being pumped into the port-side external tank on a Bf 110G-2 that bears a tropical filter unit on the wing leading edge as well as twin ETC50 bomb racks for loads up to 50 kg weight. The external tank is slung under an inverted-V frame support. *X Staffel* letter is an indicator the aircraft belongs to *13./(Z)JG 5*, which first received the G-2 variant in early 1943.

The nose area on a Bf 110G-2 assigned to *ZG 1* is having its distinctive *Wespe* artwork applied or renewed. It is outlined in black with white wings and orange body. The head is also orange, but with white applied to the bulk of the circle, while the light-colored arc fronting the white is red and constitutes the insect's mouth. The artwork was unique to this *Geschwader*.



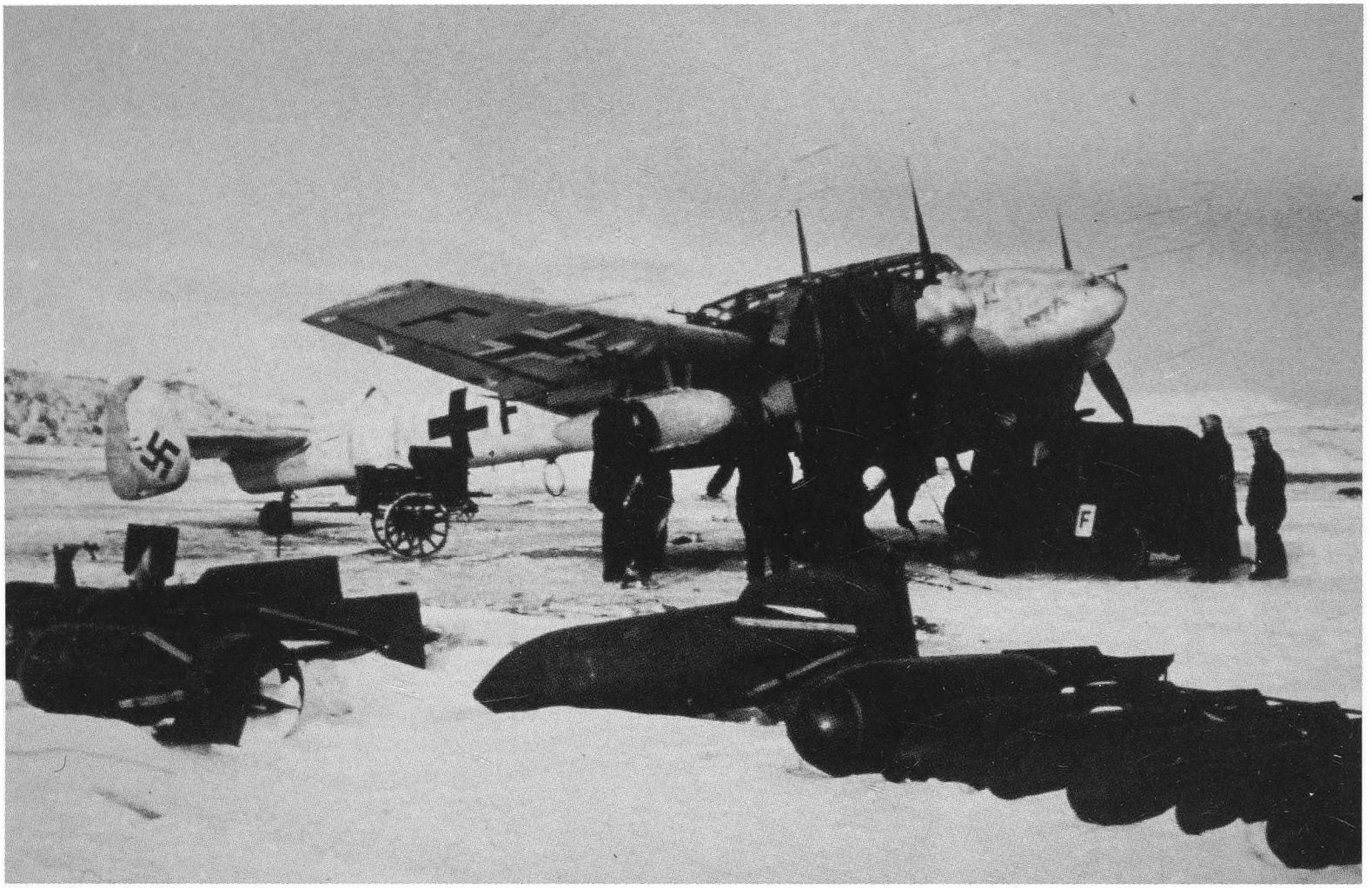
Three mechanics are indulging in a bit of horseplay while seemingly ignorant of the latent danger posed by the whirling propeller of the DB605, activated by a fellow airman in the Bf 110G-2's cockpit. The armament in the exposed upper-nose compartment has been removed from what is a *II./ZG 76* machine. Photo was taken in the winter of 1943–44, when the *Gruppe* was heavily engaged in *Reichsverteidigung* operations.



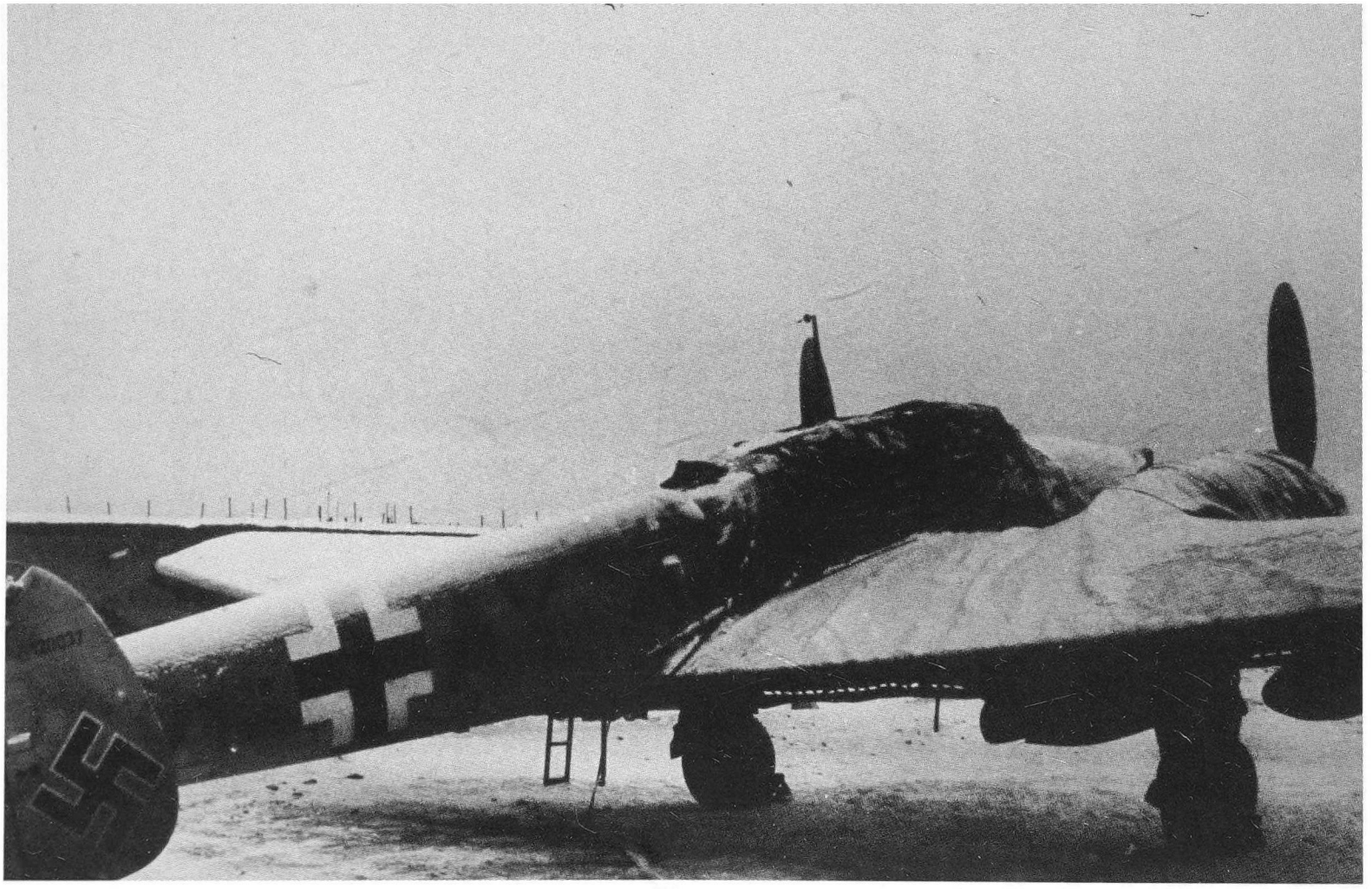
A *Schwarm* (four-plane formation) of Bf 110G-2s assigned to *5./ZG 76* are adopting a shallow echelon-right formation as the fighters skim low over the snow-swept German landscape. *WrGr.21* rocket tubes and 300-liter external tanks can be seen on the nearside duo. The *Gruppe*'s time-span on *Reichsverteidigung* operations extended over one year until autumn 1944, when it converted on to single-engine fighters to become *JG 76*.

The increasingly mortal threat posed to the Bf 110 and Me 410 by the USAAF escorts forced the Luftwaffe into providing Bf 109 or Fw 190 cover. Here, two *Rotten* (pairs), each comprising a Bf 110G-2 and an Fw 190, are taking off on a sortie. All too often, however, the escorting fighters were too taken up with their own survival; this left their hapless charges to seek their own security—something that regularly proved in vain as they were then peremptorily hauled from the sky by a P-51, P-47, or P-38.

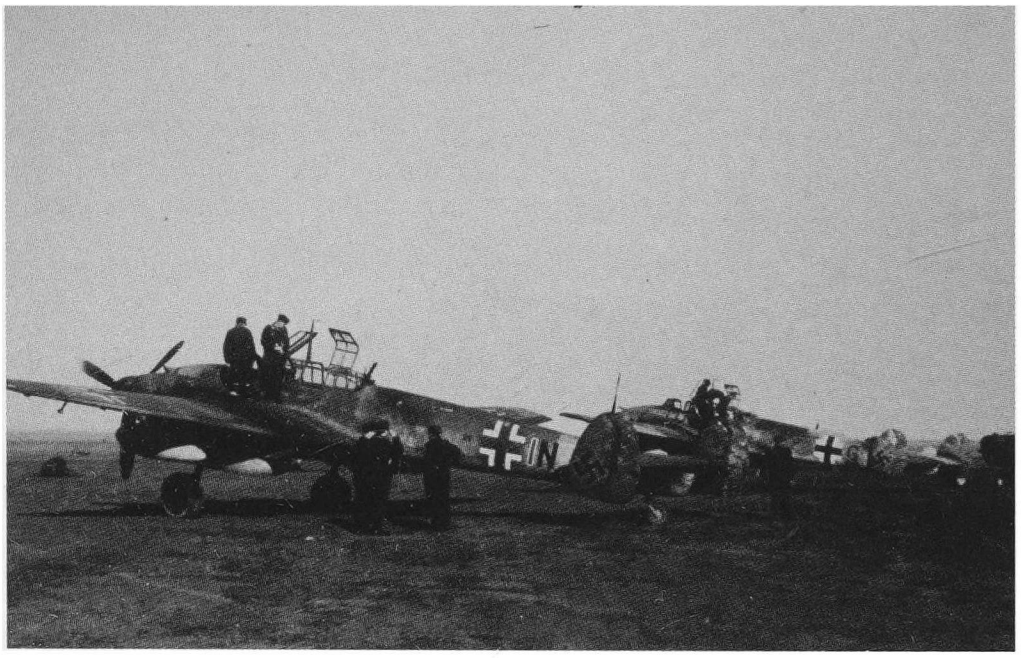
That the Bf 110 photographed here is a G-2 and not an F-4 variant is confirmed by one external alteration. This concerns the expanded bulge on the upper nose, which in the G-series case contained a gun camera as opposed to the slimmer air scoop applied to the E- and F-series airframes. The tips of the spin-stabilized 21 cm rockets can be seen just protruding from the tube rims.



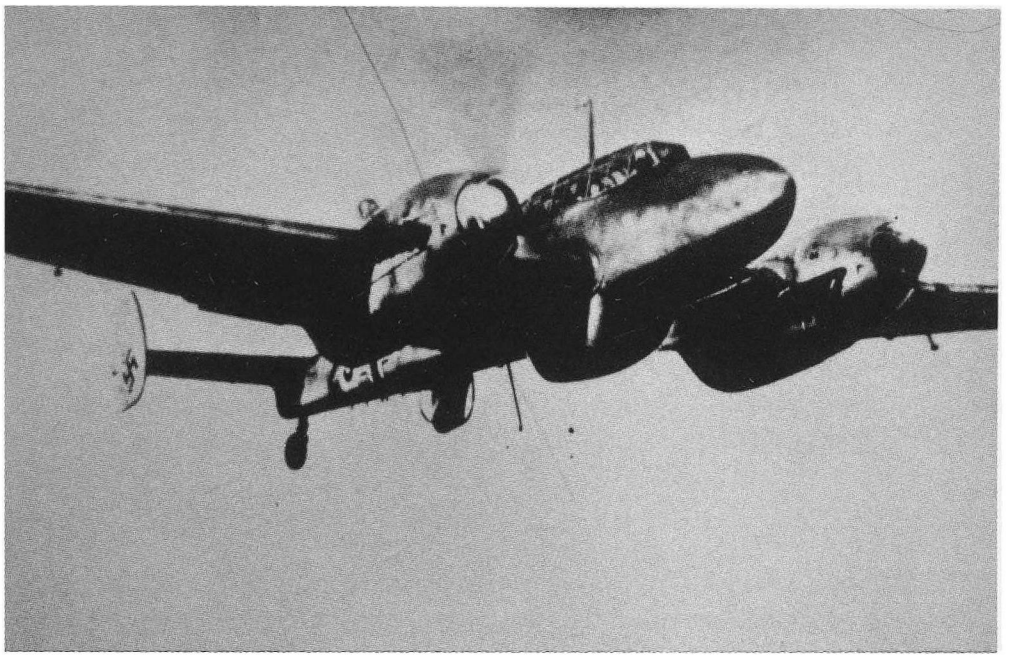
The ETC50 bomb rack just outboard of the starboard 300-liter external tank and enlarged propeller spinner cover are indicators of the Bf 110'sG-2 status. The LN unit codes confirm it is serving with *(Z)JG 5*. The normal camouflage has been given a wash of white paint to help its outline blend with its winter surroundings. The line of bombs strewn on the ground includes what seems like an SC1000 on the left.



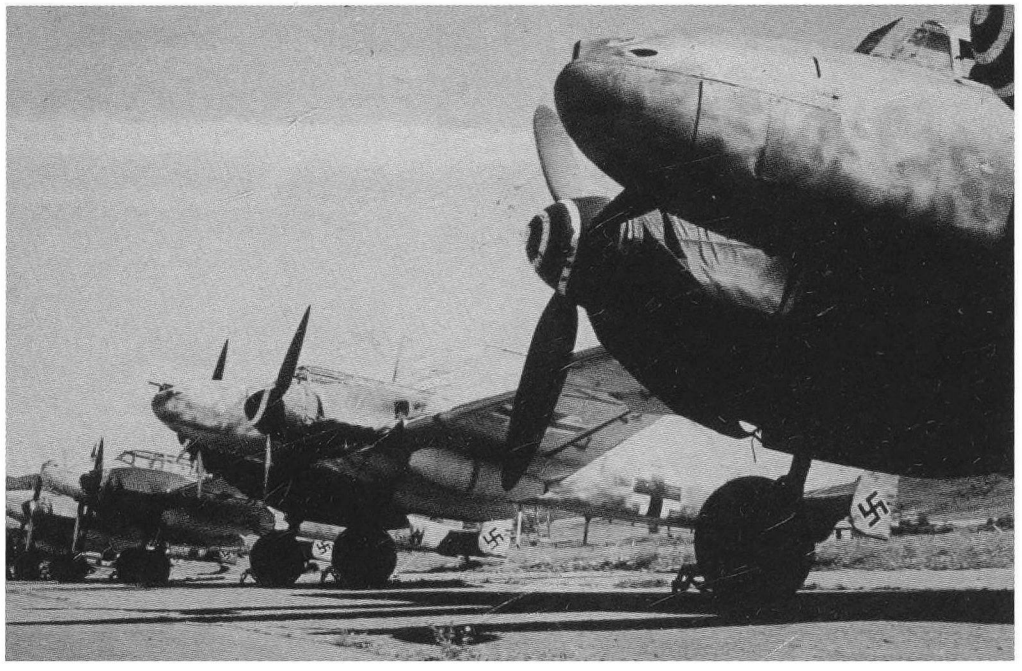
A Bf 110G-2 sports a moderate crusting of snow over the flight surfaces and the tarpaulin-wrapped DB605 engines. The original LN code letters borne by *JG 5*'s *Dackelstaffel*, which converted to the G-2 in February 1943, were changed to 1B during the latter stages of World War II. Winter operations in the Far North of Europe, where the *Geschwader* was mainly stationed, bore down on the aircrew but was also particularly hard on the ground crew personnel.



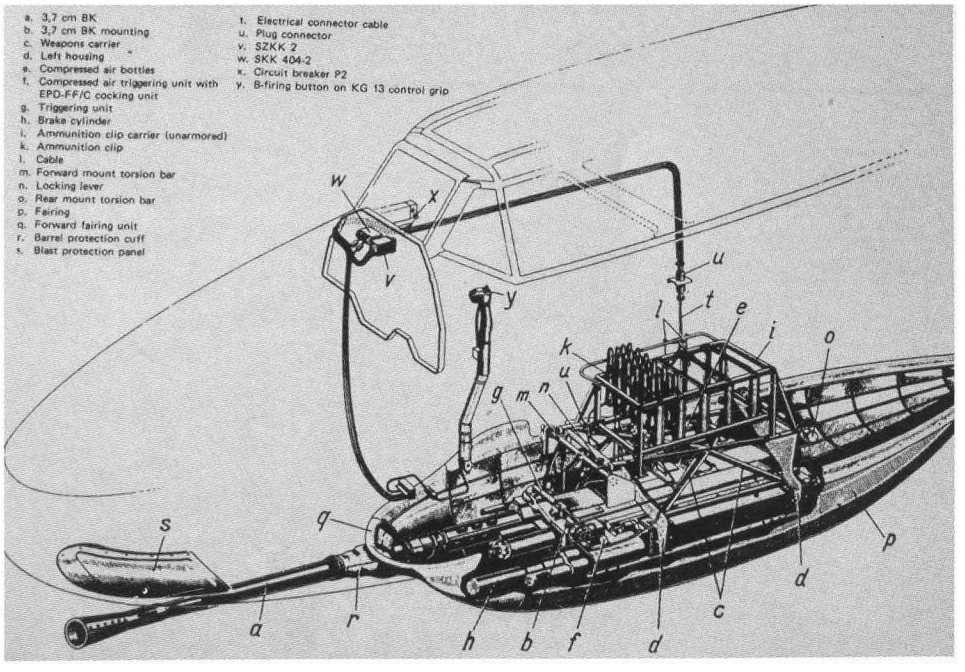
The trio of Bf 110G-2s belongs to *NJG 200*. This *Geschwader*'s brief was in sharp contrast to its Bf 110 contemporaries, since its crews were directed against the Soviet air force. *Helle Nachtjagd* was the operational norm backed by GCI facilities that were mobile as they were placed in railroad carriages. What was known as the *Eisenbahngeschwadern* concept—consisting primarily of Ju 88–equipped units—would accompany the trains to whatever sector of the front was selected by *Oberkommando der Luftwaffe* or *OKL* (Luftwaffe High Command).



The absence of effective long-range escort fighters for the 8th Air Force until the winter of 1943–44, permitted the Luftwaffe to deploy ultraheavy offensive weaponry on its twin-engine fighters in particular. In this case a Bf 110G-2/R1 reportedly from *ZG 1* is heading out for a sortie equipped with a 37 mm Flak 18 cannon applied under the center fuselage. The striking power of the ammunition would wreak havoc with the airframe of even a large aircraft such as the B-17 or B-24.



The European Conflict is over and a line of Bf 110G-2s stand in splendid isolation upon an airfield in Norway. They had formed part of *IV./ZG 26*'s complement of fighters. The detached port rudder on the second-aircraft was part of a wholesale measure intended to prevent any Allied pilot from attempting to take one into the air. The light spiral lines on the spinners was not an affectation but was intended to confuse an opponent with its visual distorting effect.



The mounting of ever-heavier-caliber weapons on the *Reichsverteidigung* twin-engine designs was exemplified by the ventral attachment to the Bf 110G-2 of the 37 mm Flak 18, a normally ground-operated unit. The drawing demonstrates how the ammunition was vertically fed into the breech and the antiblast frame was placed in the lower fuselage, directly above the gun muzzle.

CHAPTER 9

Bf 110G-4

The expansion of RAF Bomber Command into a truly massive force, which commenced as 1943 was entered, was paralleled by the introduction of the Bf 110G-4 within *Nachtjagd* ranks, commencing in June 1942, which by year's end was making up a sizeable element of the nearly 400 *Nachtjagd* fighters on hand; their effect on Bomber Command was ever expanding, with nearly two-thirds of the 1,291 bombers MIA credited to them. The crew complement was now standardized at three. Rear cockpit access on all Bf 110G airframes changed from the swiveling three-panel frame used as far as the F-3 variant to a section directly behind the radio mast hinged on the canopy's starboard side; this arrangement allowed both the *Bordfunker* and *Bordschuetzer* a common access point.

The Bf 110F-4 and G-4 duo of dedicated night fighter variants would be produced in sizeable numbers; during 1943, for instance, no fewer than 1,580 G-4s were turned out, of which the majority were equipped for *Nachtjagd* operations. Production of the F-4 was not curtailed until the beginning of 1943.

Onboard Radar

The provision of onboard radar had passed through several phases, with Telefunken's *Lichtenstein* system heavily involved, as recorded here:

Lichtenstein BC

A horizontal crossbar fixed to the nose supported two parallel "U" frames bearing "X"-pattern subframes on their tips. Each subframe in turn supported two vertically aligned "H-pattern" dipole aerials and reflectors. Maximum search angle was 70 degrees laterally, and range was 2.5 miles (4 km) down to 218 yds. (200 m). The operator scanned three cathode-ray tube (CRT) screens. The left screen was for long-range search in the form of a circular time base; targets were depicted as peaks standing out from the circular trace, with distance measured against a kilometer scale mounted around the screen perimeter. The central screen provided a short-range display of the target's vertical position compared to the Bf 110; the right screen displayed the target's lateral disposition.

Lichtenstein C1

Introduced in October 1942, *Lichtenstein C1*'s aerial array minimized the drag factor since it consisted of a single rod bearing a vertically aligned "X" frame with four short horizontal extensions, onto which were mounted eight dipole aerials. The 54 Mhz operating frequency was the same as with the BC sets, and there was a mix of positive and negative features. The positive involved an increase in lateral search angle from 70 to 120 degrees, while minimum range was reduced to 109 yds. (100 m); unfortunately, these improvements were paralleled by a halving of the maximum-range capability from 2.5 miles (4 km) to 1.2 miles (2 km).

Lichtenstein SN-2

The operational advent of Telefunken's latest electronic search equipment occurred in October 1943, and SN-2's (FuG220) mass presence materially assisted in redressing the imbalance in *Nachtjagd* operations following the first use by RAF Bomber Command of the screen-blinding "Window" over Hamburg the previous July. Developed from an antishipping device, it operated on a switchable trio of 72, 81, or 92 MHz frequencies, which rendered it impervious to "Window's" cloying effect. Ever-greater

external aerial arrays christened *Hirschgeweih* (deer's antlers) had to be borne in order to accommodate the top MHz frequency, thus further adding to the aircraft's existing speed and maneuverability inhibitions.

Three production versions were introduced:

Model A: This set's maximum range was 4 miles (6.4 km), but minimum range was poor, at 500 yds. (457 m). The latter factor could be improved only by parallel use of *Lichtenstein C1* (FuG212), whose extra presence only added more airflow drag to the Bf 110's already moderate performance, which was still adequate to maintain contact with the "bomber stream."

Model B: Introduced in May 1944, the set's circuitry had been modified to reduce minimum range to 272 yds. (250 m). Although still greater that the FuG212 figure, this was small enough for the latter to be dispensed with. The Model A sets were still retained by operational *Gruppen*, but only as spares. The model was initially still free from "Window" jamming due to the metal strip length in current RAF use equating to a frequency level below that of the SN-2 sets. Luckily, the accidental delivery of a *Nachtjagd* Ju 88G into British hands during July allowed examination of the equipment. The "Window" strips were duly cut to the extended length that coincided with the SN-2's frequency range, and all too soon the crews were experiencing serious interference with their screen presentations.

Model D: The sets incorporated a duel-range facility of 6.2 and 2.5 miles (10 and 4 km), while the close-range circuitry was incorporated within the latter's range presentation. In addition, the dipole aerials for what was titled SN-2d were canted at 45 degrees.

Operations

The bomber offensive's ebb and flow swung temporarily in Bomber Command's favor in late July 1943. The introduction of "Window"—the radar-blinding metal strips cast out into the atmosphere over Hamburg—almost completely nullified the Germans' flak and airborne defensive equipment. This action proved the death knell for the *Himmelbett* system in particular, but the advantage enjoyed by the RAF crews was short lived and rebounded in basically indefensible manner as regards both tactics and weaponry.

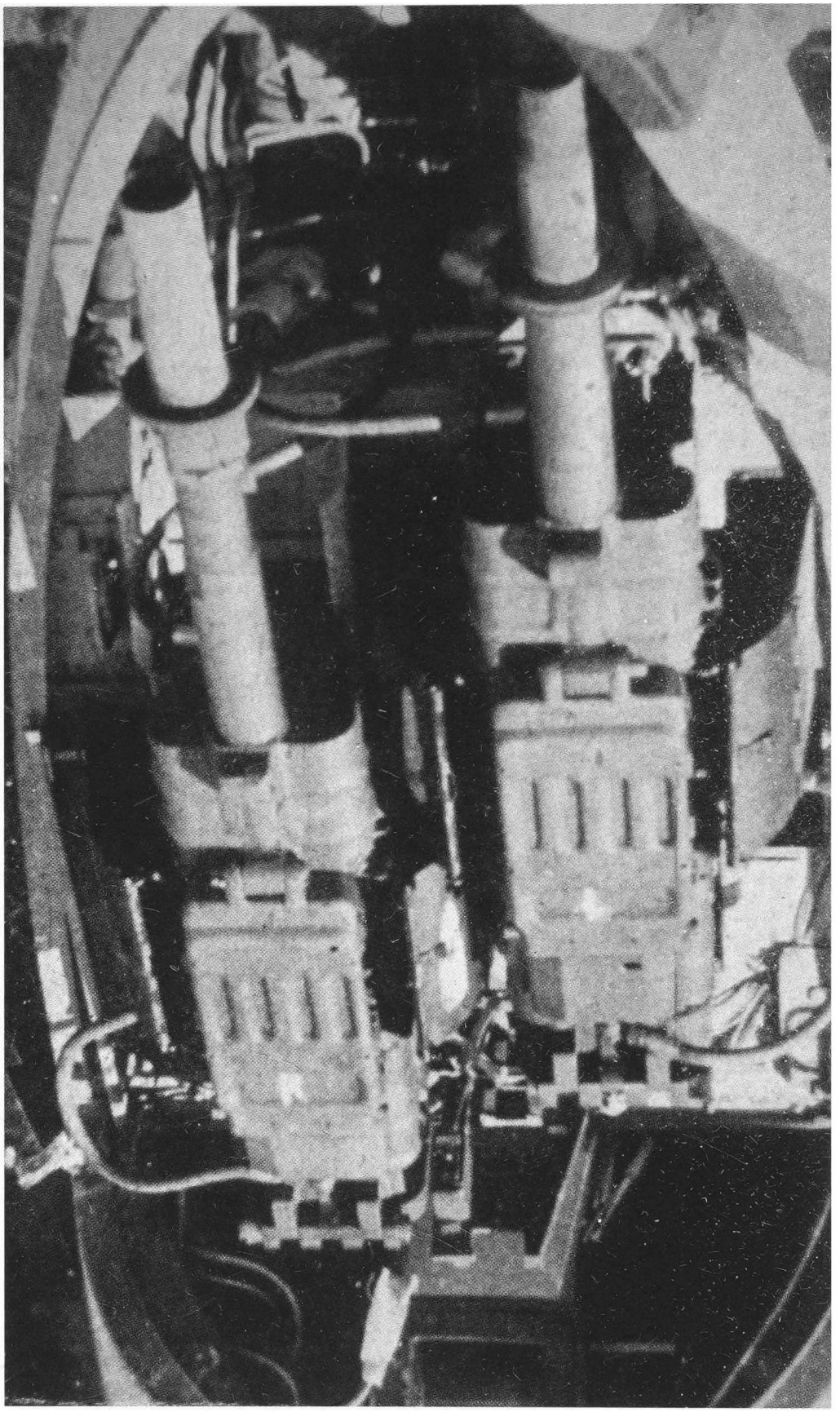
As regards the first, the Luftwaffe hierarchy abandoned the foregoing defensive measure in favor of a dispatch of the *Nachtjagd* fighters to seek out the bomber stream and infiltrate its ranks; the crews would engage the bombers as long as they had contact, and divert into any available airfield when short on fuel, as opposed to automatically returning to their normal airfield, a variation that extended their active involvement.

The second measure that handed the advantage to the crews almost up to the conflict's conclusion was the introduction of *schräge-Musik* (code name for an upward-firing weapon whose technical features are more comprehensively covered in chapter 10). Adding to the bomber crews' woes was the use of radio beacons spread across the Continent, to which the fighter would be directed to head for and orbit. The crews would then wait to be directed into the path of the bomber stream depending on where the ground controllers deemed it to be progressing toward (the "Window" screen ironically better assisted the Germans in more easily plotting the formations' direction).

Once in the stream, the *Bordfunkers* would direct their pilots on to a target, being initially confident that their SN-2 sets would gain the necessary minimum visual range, either with the assistance of *Lichtenstein C1* (Model A) or unassisted (Model B) when the latter was introduced in May 1944. A degree of advantage again swung Bomber Command's way when the Models A and B sets were compromised by the advent of suitably lengthened Window strips, which restored a "blinding" effect on the set screens.

However, it took the introduction of No. 100 (Radio Counter Measures, or RCM) Group with its range of electronic-jamming devices during 1944 to materially lessen and ultimately largely subvert the lethal impact of the free-ranging *Nachtjagd* crews on their lumbering and basically defenseless adversaries. This was none too soon, given that more than 1,000 bomber crews were lost between November 1943 and March 1944—more than the command's total available complement at this time—of which the clear majority were night fighter victims. Although the Ju 88G was on hand by the latter date, it appears the Bf 110 rightly took the credit for the majority of the *Abschuesse* figure.

The ultimate nadir in *Nachtjagd* fortunes commenced during mid-1944. No. 100 RCM Group's comprehensive electronic blinding of the ground radar sets extended to creating a solid wall of interference that prevented the Luftwaffe controllers from gaining advanced knowledge of a bomber stream's existence; dispatch of night fighters to probe beyond this technical barrier often brought no results, thanks to there being no operation launched. Even when detected, the result ended with the *Nachtjagd* crews being faced with more than one bomber force, as opposed to the previous situation, when a single "stream" proved mandatory. Diversion raids flown usually but not exclusively by Mosquitoes further drained the *Nachtjagd* personnel's ability to deliver a concentrated blow. (Single No. 100 Group multiengine aircraft also indulged in this deceptive measure with their onboard array of equipment but ran a heightened risk of interception that did result in some casualties.) Finally, the advance of the Allied armies right up to the German borders allowed the deployment of ground-based countermeasure equipment that left the enemy controllers with even less of a time margin within which to scramble their fighters. By early 1945, the heavy losses borne by Bomber Command's crews were thankfully a thing of the past.



The original 20 mm 151/20 cannon proved to be a fearsome-enough weapon, but the striking power of the 30 mm MK108s seen here, which often replaced them, was even more lethal; just several strikes were regarded as enough to bring about a bomber's destruction. The brilliant flash effect was not however appreciated by the pilots in particular, many of whom preferred the original combination of 151/20 cannon and MG17 machine guns.

Bf 110G-4/R3 Specifications
(Three-Seat Night Fighter)

Dimensions
Length: 41 ft. 6 in. (12.66 m)
Height: 13 ft. 1¼ in. (4 m)
Wing span: 53 ft. 4 in. (16.28 m)
Wing area: 413 sq. ft. (38.37 sq. m2)

Armament
Two Rheinmetall 30 mm Mk. 108 cannon in upper nose (135 rpg)
Two 20 mm MG151/20 cannon in the lower nose (350 and 300 rpg)
Twin 7.92 mm MG81Z machine guns in rear of the cockpit (400 rpg)
The installation of two MG/FF 20 mm cannon (schräge-Musik) in the rear cockpit was an optional supplementary form of offensive armament, although becoming evermore standardized following its introduction in mid-1943.

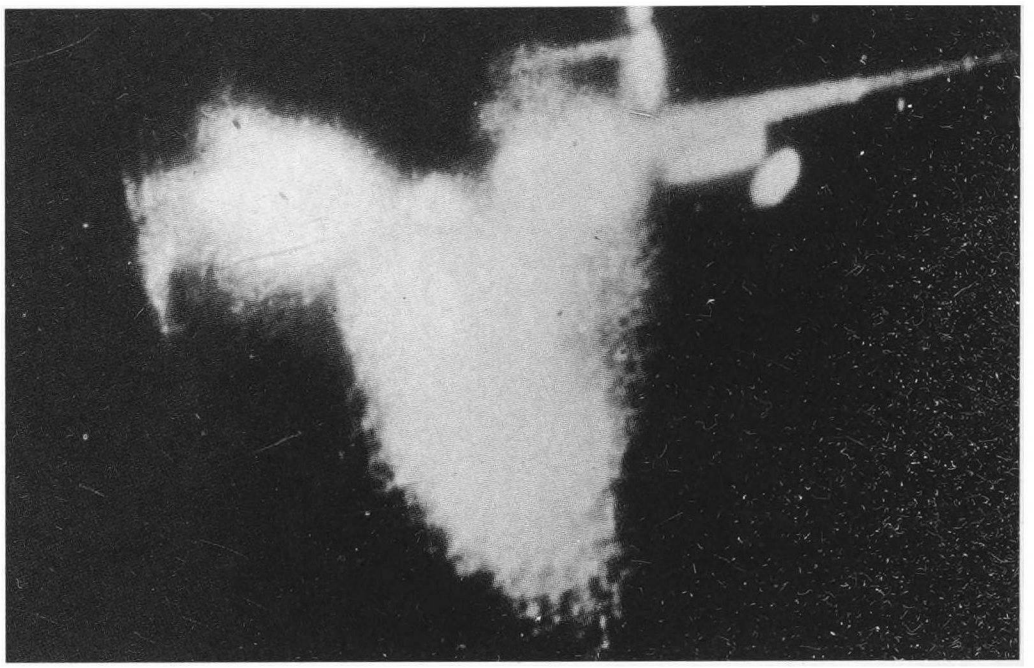
Power plant
Two 1,457 hp Daimler-Benz DB605B; twelve-cylinder, inverted-V, liquid-cooled engines
Metal, VDM three-blade, variable-pitch propellers

Weight
Empty: 11,220 lbs. (5,089 kg)
Normal loaded: 20,700 lbs. (9,390 kg)

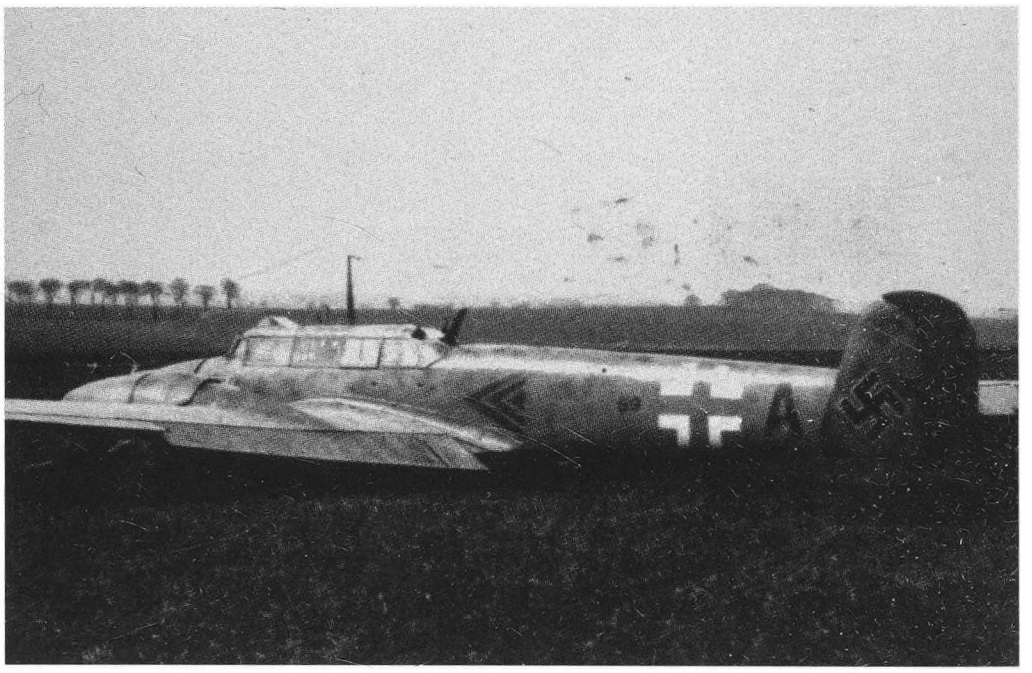
Performance
Maximum speed: 342 mph (550 km/hr.) at 23,000 ft. (7,010 m); 311 mph (500 km/hr.) at sea level
Maximum range: 1,305 miles (2,100 km), carrying two 198-gallon (900-liter) external tanks
Operational ceiling: 26,000 ft. (7,925 m)
Climb rate: 2,306 ft./min. (703 m/min.) up to 18,000 ft. (5,486 m)

Josef "Beppo" Schmid's World War II career successively plumbed the depths and scaled the heights. As a staff officer, his 1940 intelligence assessment, *Studie Blau*, relating to Britain's aerial defenses, painted a largely erroneous impression of frailty when presented to Göring and his senior staff. Recovery from this debacle began with his appointment in charge of *Fliegerkorps XII*, replacing *Gen.* Kammhuber in late 1943. His subsequent direction of *Nachtjagd* operations proved tragically efficient as regards the effect on Bomber Command's aircraft and crews.

Helmut Lent, photographed here as an *Oberst*, was another *Experte* who had gained his operational spurs with *NJG 1* back in 1940. He ran up a score of 113 *Abschusse*, which included eight during daylight, a record that witnessed the award of the *Ritterkreuz* with Oak Leaves (*Eichenlauben*), Swords (*Schwerten*), and Diamonds (*Brilllianten*). His 1944 appointment as *NJG 3 Kommodore* ended tragically on October 7, when he and his crew were killed following the crash of their Ju 88G when on a nonoperational flight.



The hunter sometimes became the prey, especially as the Intruder Mosquito began to make its presence felt from late 1943 onward. In this instance, a Bf 110G-4 has been homed in on and is absorbing a number of strikes that will prove lethal. The *Nachtjagd* crews were ever conscious of their adversaries' looming presence and fought hard to come to terms with what was (rightly) known as *Moskito-panik*.



The circumstances that induced the crash landing of this Bf 110G-4 is unclear. What is clear is that the triple-V insignia denotes the *Kommodore*'s aircraft within the ranks of *NJG 1*, but whether he was in charge of the aircraft is unclear. The D/F loop on the G-4 was removed from its ventral location to just ahead of the radio mast, as can just be discerned here. The pilot's canopy appears to bear a Plexiglas blister.

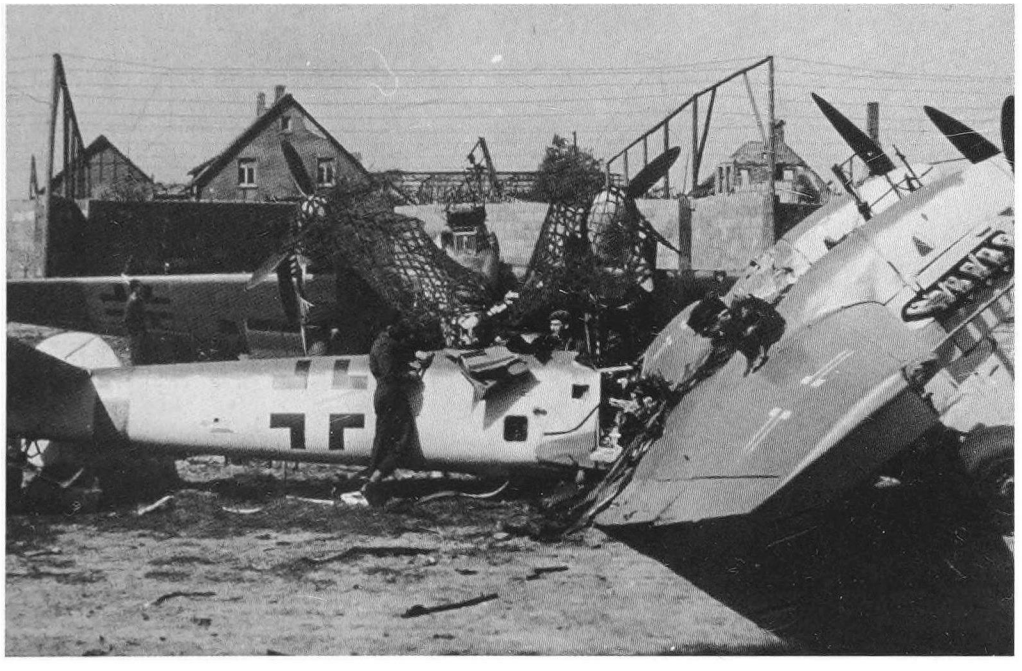
Maj. Willi Herget, the diminutive *Kommandeur* of *I./NJG 4*, has been settled into the cockpit by his *Bordfunker* as the gunner prepares to don his helmet. This *Experte* flew operations between April 1942 and June 1944, during which period he downed fifty-seven Allied aircraft. On the other hand, he was downed three times and crash-landed a further four times! He survived the war but died during the 1970s, while still relatively young.

These Bf 110G-4d/R3s bear the standard *Lichtenstein SN-2* (FuG220 Model B) radar sets; these dispensed with the use of the separate *Lichtenstein C-1* equipment, and central-nose-positioned aerials previously deemed necessary for picking out a target at minimum range. Note the heavy mottle on the nearside fighter, as well as the black starboard lower-wing surface, intended as a friendly aircraft indicator to flak battery gunners.

A US Army truck shares this photograph with one of the hundreds of abandoned Luftwaffe aircraft discovered by the advancing Allied armies. The former pristine airframe is bereft of propellers, most of the cockpit frame, and the starboard fin and rudder. The flaps and port rudder are liberally stripped of their surfaces, while the *Hirschgeweih* frames lack their aerials. Reduced-scale 3C letters denote an *NJG 4* machine.

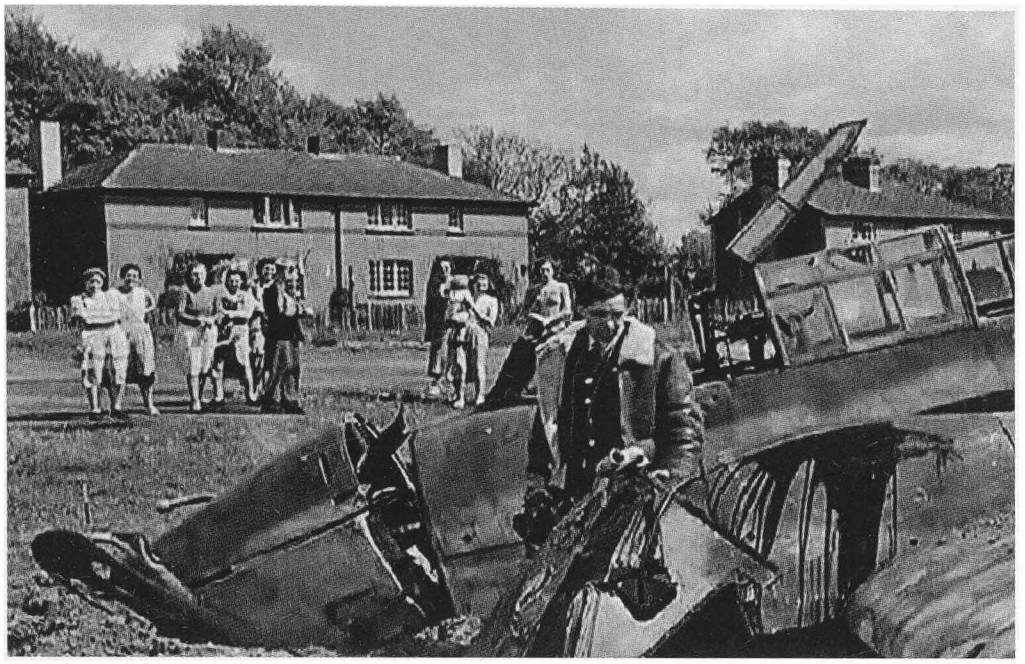
Following the conclusion of World War II, a sizeable collection of individual Luftwaffe designs were brought back to Farnborough for comprehensive evaluation. The Bf 110G-4 seen here lacks the *schräge-Musik* weapons, but these may well have been extracted back in Germany since they were now redundant. The RAF markings displace their Luftwaffe equivalent, which was more daunting in appearance. An Me 410's propeller intrudes on the right of the image.

Under inspection by British army soldiers at the airfield of Brunswick-Waggum are the shattered remnants of a Bf 110G-4 that lacks the normal external aerials. The simplified camouflage pattern of RLM74 *Dunkelgrau* (dark gray) and RLM76 *Weissblau* (white-blue) came into operational fashion toward the end of the conflict. Note the yellow outer-wing sections applied to the undersurfaces and the unlined *Balkenkreuz*.

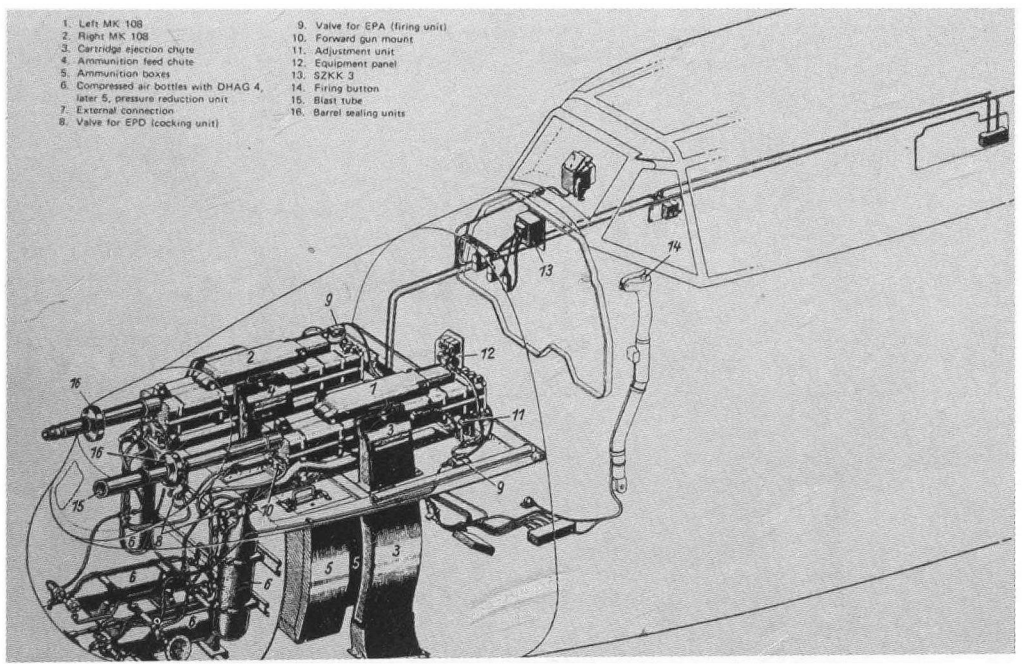


A lateral view of the same Bf 110G-4 shows the gutted central fuselage, which has collapsed the wings upward and pitched the front section of the fuselage onto its nose. Picture angle also shows how the RLM74 *Dunkelgrau* color is confined to a narrow strip along the fuselage top surface. The low-visibility scheme made detection by an adversary very difficult in the night sky.

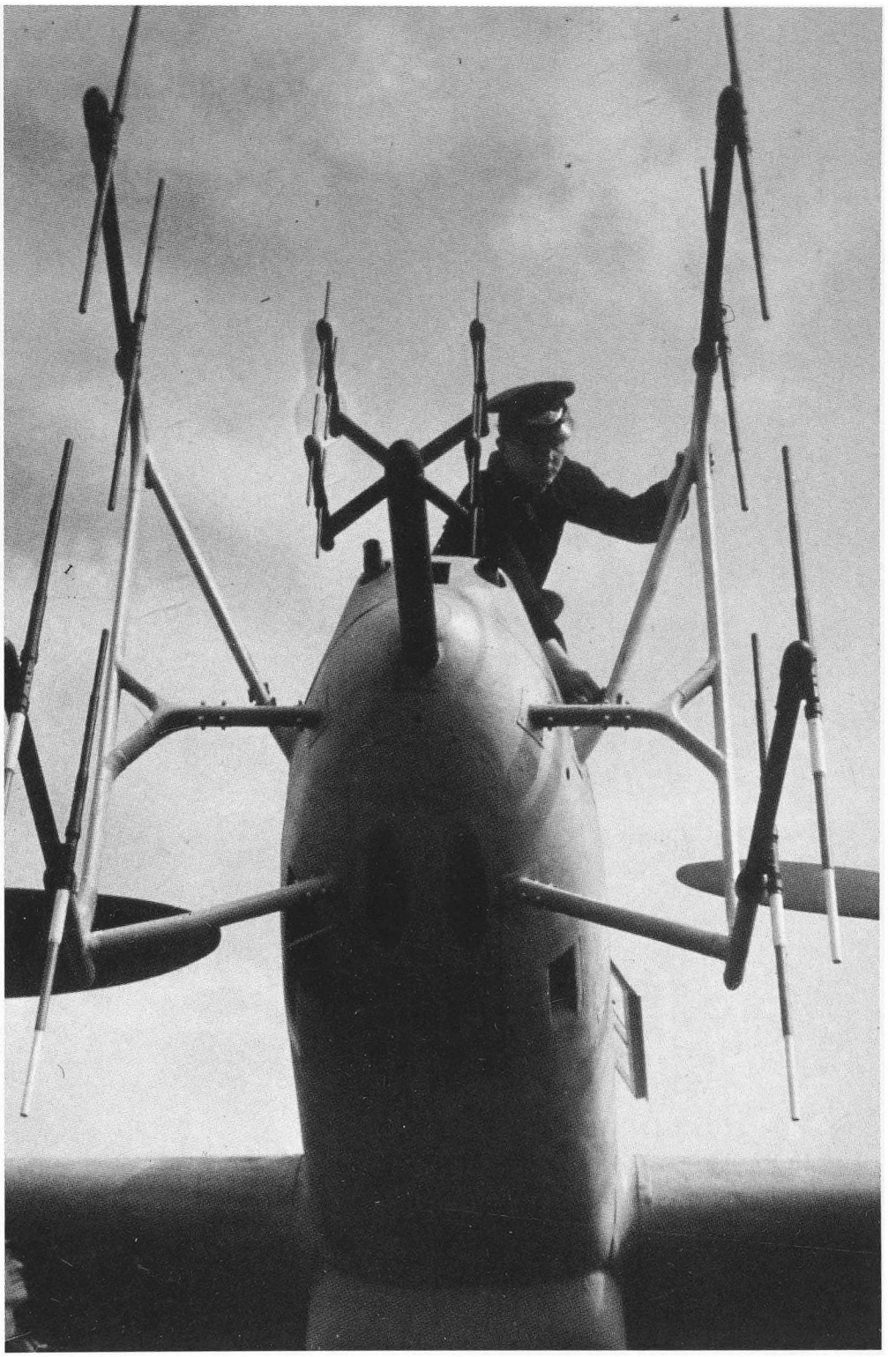
USAAF personnel from a P-38 fighter group are massed around an abandoned Bf 110G-4 at Braunschweig in May 1945. World War II has just been concluded, and the *Nachtjagd* night fighter is just another redundant piece of military hardware, to be either scrapped or in a few cases retained for official evaluation. The *schräge-Musik* cannon are located right at the rear of the cockpit.



British actor John Ericson, making his acting debut, poses amid the wreck of what appears to be a late-pattern Bf 110 airframe, judging by the side-hinged rear canopy frame; this was a standard fitting on the G series, although originally introduced on the F-4. The film was *Angels One Five*, a 1951 film based on the Battle of Britain, which dispatched Ericson into a stellar career within the film industry.



The quartet of MG17 nose-mounted machine guns was destined to give way to the 30 mm MK108 cannon early on in the case of the Bf 110G, following its inception on operations. The overall striking power of the Bf 110G-4's replacement weaponry when added to by the ventral pair of MG151/20 cannon was increased to a fearsome degree.



The large aerial array known as *Hirschgeweih* (deer antlers) relates to the FuG220/SN-2 variation of the *Lichtenstein* series of airborne radar systems used by the *Nachtjagd* crews. The original sets possessed a poor ranging ability over the final stages of an interception, but the disability was initially countered by Lichtenstein FuG212/C-1 equipment, as confirmed by the compact aerial array in the center. A refined version of SN-2 that featured a minimum ranging capability resulted in the C-1 system being dispensed with.

CHAPTER 10

Schräge-Musik

Up to mid-1943, the majority of night fighters, Axis or Allied, employed their offensive weaponry mounted either in the nose or, as regards the Mosquito, for instance, within the bomb bay or in an external ventral location. Exceptions such as the Boulton-Paul Defiant possessed a four-gun rotating turret with which to attack from below, but lacked range as well as an ability to carry a normal-scale radar set.

The basic disadvantage with the nose or ventrally equipped designs was that the natural tendency to aim for the fuselage risked an explosive effect that could consume the attackers along with their victims. An alternative tactic of trailing the bomber from below and firing a burst by standing the fighter on its tail risked losing height and distance if the bomber survived this assault.

Maj. Rudolf Schoenert and Expert and *Fw.* Paul Mahle, a senior mechanic, are separately credited with a development destined to hand the *Nachtjagd* a long-term and virtually indefensible advantage over Bomber Command, one that would cause mayhem among its ranks. The current range of night fighters would retain or sometimes supplement their standard weapons, but what was code-named *schräge-Musik* (jazz music) was now added. This consisted of two 20 or 30 mm cannon located in the Bf 110F-4 and G-4 rear cockpits or on the fuselage spines of the Ju 88, these designs constituting the twin aerial pillars of the *Nachtjagd*'s strength. The weapons were angled forward at 70 degrees—hence the *Schräge* reference—and the pilot was provided with a cockpit ceiling-mounted gunsight.

Tests of the equipment fitted into two night fighters at Parchim—home for *5./NJG 5*—saw both ready to participate on August 17–18, 1943, when Bomber Command attacked the rocket research center at Peenemuende on the Baltic. The results were startling, with no fewer than six bombers downed between the crews, one of whom had never flown on operations before. This was an ominous portent of what awaited the RAF.

The lack of a ventral turret similar to that borne by the USAAF's B-17s and B-24s meant that the Lancasters, Halifaxes, and Stirlings were visually blind from this angle; some bombers were equipped with single guns underneath, but the visual aspect for the airmen manning these was naturally poor. The weaving action known as a corkscrew, usually employed when a fighter was visually picked up, could not be sustained as a safeguard during the bulk of an operation, thanks to the inordinate physical effect on the pilot.

The result was that the night fighter's gradual approach from below allowed the pilot to close in and hold formation with the bomber that was then outlined in plan format. The gunsight would accordingly be focused not on the fuselage but rather on one wing. Contained therein were the fuel tanks, whose ignition from the cannon shell strikes would normally spell doom for the aircraft and sadly for some or all of the crew as their charge drooped or spiraled into an irrevocable descent.

There was a potential risk to the attacker should, for example, the wing be blown off due to the extra volatility of a partially full tank, which now contained fumes in the unoccupied element. The night fighter's proximity, which was sometimes measured at less than 50 m, meant that the pilot could not get clear of the wreckage emanating either from the wing fragments or from a swift, progressive disintegration of the overall airframe that occasionally evolved. (A leading *Experte Maj.*, Manfred Meurer, was reportedly lost when the targeted Lancaster in question suddenly rolled over and made fatal contact with his aircraft.)

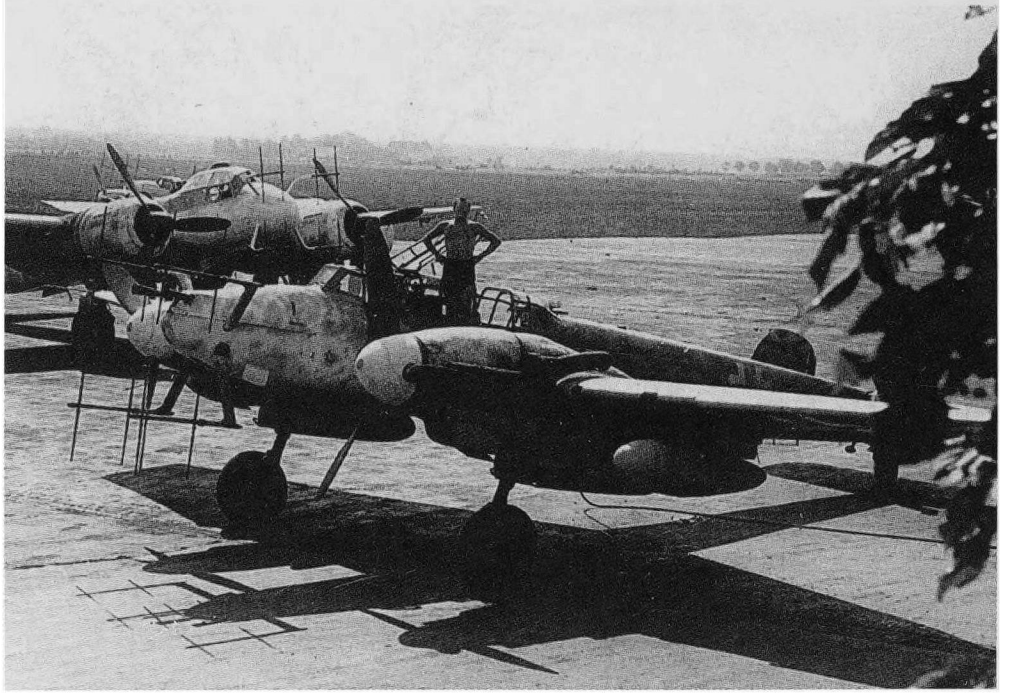
The feeding of the *Nachtjagd* crews into the bomber stream (as outlined in chapter 9), which had replaced the now-redundant *Himmelbett* system, was known as *Zahme-sau* (tame boar), and its employment from the early autumn of 1943 onward reaped a

rich harvest, especially during the winter of 1943–44, when the bombers were regularly penetrating deep into the Third Reich, with Berlin as the epicenter of the offensive. By the end of March 1944, more than 1,000 bombers had been lost, the majority to night fighters, with *schräge-Musik* a regular contributor to this horrendous scale of attrition.

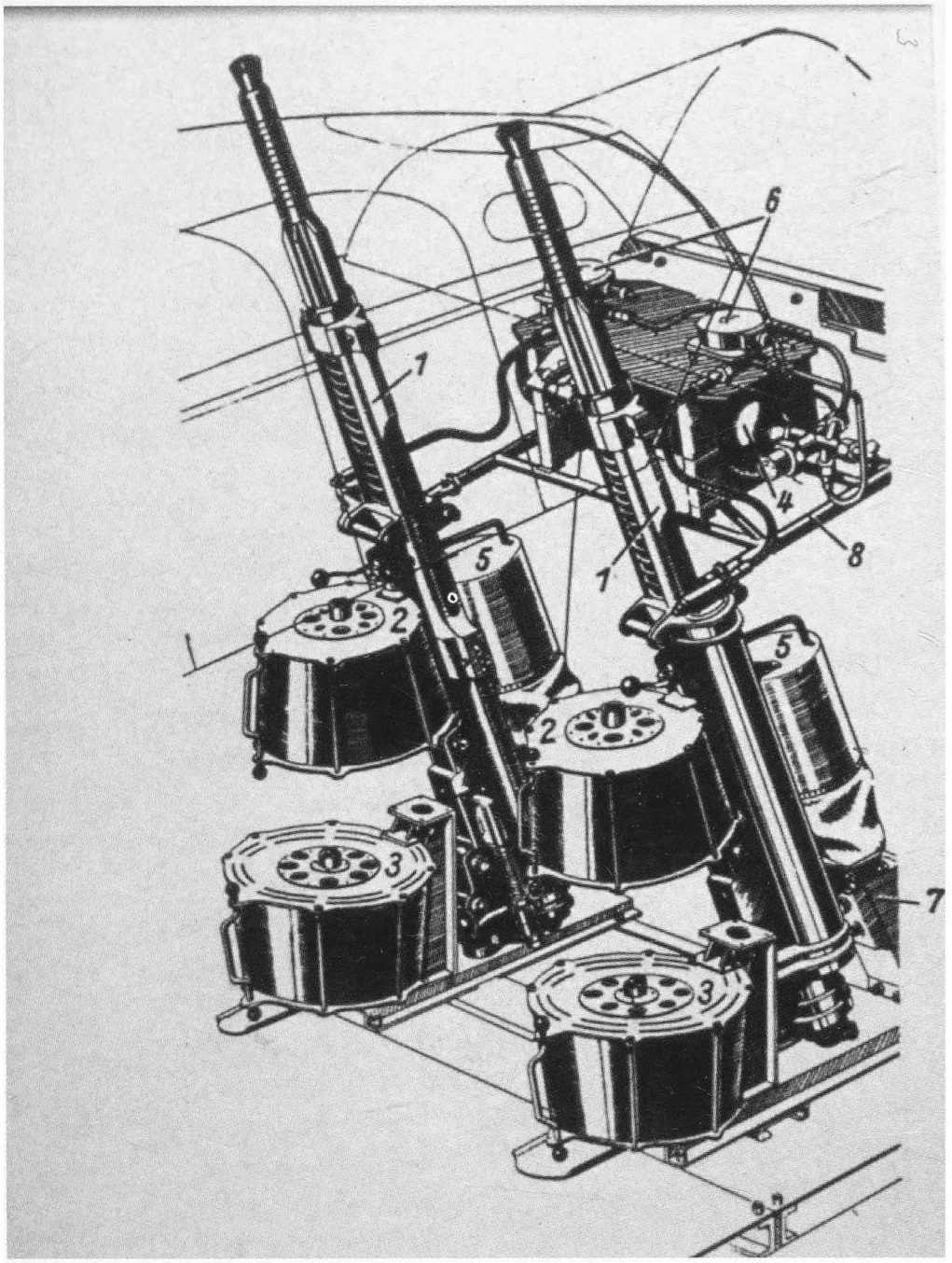
The RAF bombers did employ a tail-warning device (*Monica*), but the equipment could not differentiate between friend and foe. Worse still was the ability of a counterdevice (*Flensburg*) that homed-in on the set's signals. A similar situation affected the emissions of the blind bombing and navigation equipment known as H2S, which provided a crude outline of the terrain passing beneath the bomber; its technical menace was known as *Naxos*. Between this duo and the current SN-2 sets' freedom from "Window" jamming, the night fighters held most of the aces, with *schräge-Musik* adding the final blow.

A number of *Experten* ran up individual tallies of anything up to eight bombers during a single sortie, as well as doing so with a minimum of ammunition expenditure; as an example, the striking force of the Mk. 108's 30 mm shell was sufficient for fewer than five rounds to ensure a target's destruction. (*Monica* was deleted from operational service after the *Flensburg* equipment on the Ju 88G that landed in Britain during July 1944 was evaluated along with the SN-2 set.) What was arguably *schräge-Musik*'s greatest tally occurred on March 30–31, 1944, during a planned raid to Nuremberg in southeastern Germany. Not only was the operation largely a failure in terms of bombing, but no fewer than ninety-four Lancasters and Halifaxes were culled, with a high proportion becoming victims of the weapon's application.

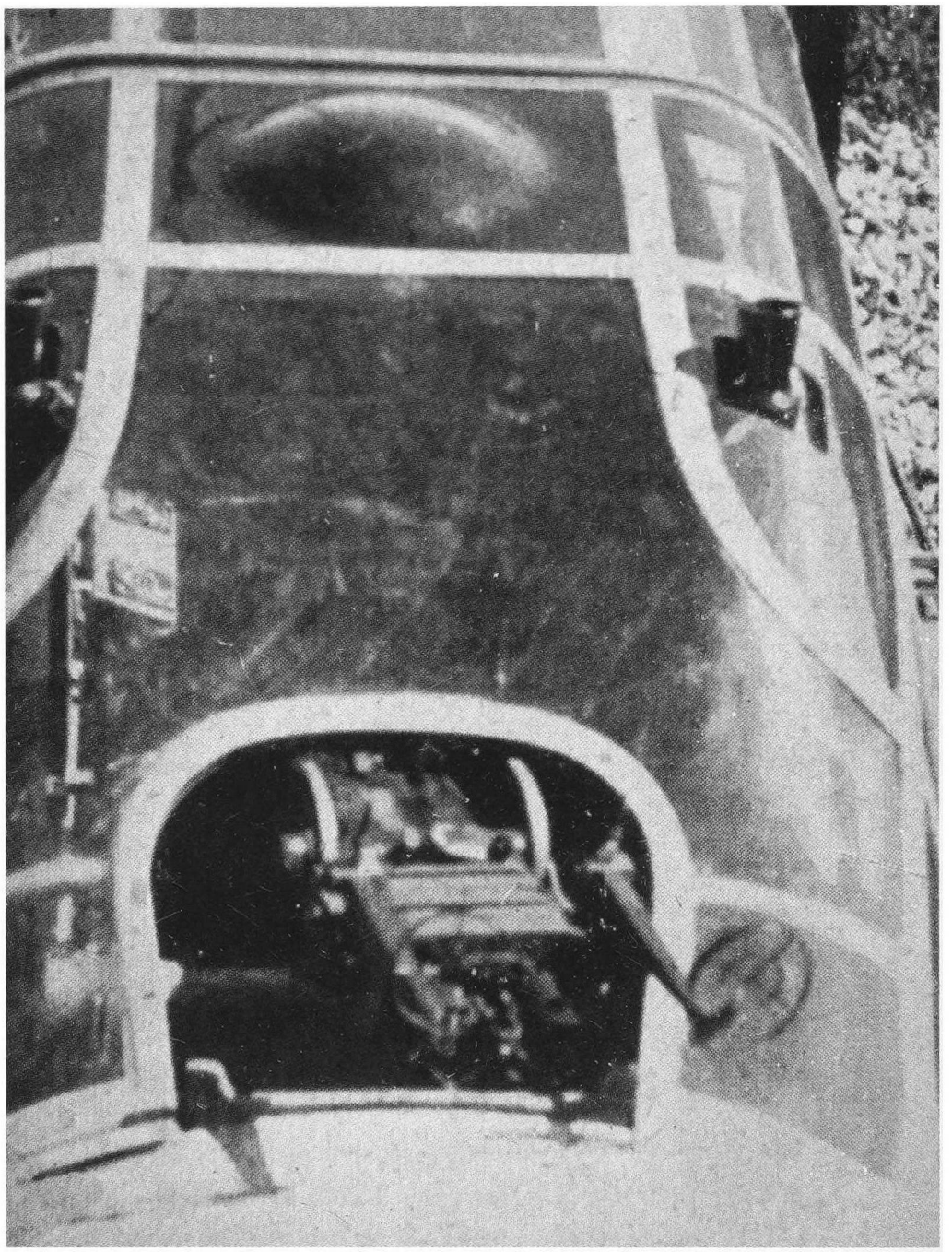
Although fighter countermeasures were indulged in, the visual inability to provide anything like a comprehensive escort force similar to the USAAF limited the support to a marginal number of first Beaufighters and then Mosquitoes. The latter design enjoyed greater range, and its deployment took the form of attempting to pick up adversaries as they either headed for or were disengaging from the bomber stream. Interdiction of clearly lit-up airfields or areas known to contain night fighter bases was also indulged in, and the tactic steadily gained results as the RAF's radio countermeasures began to place the *Nachtjagd* evermore on the back foot from early 1944 onward. The fear of being intercepted on takeoff or, worse still, at the end of a sortie, when fuel and ammunition were usually in minimal supply, did breed an apprehensive mindset that became known as *Moskito-panik* (this was a latter-day variation of the *Kanalkrankheit* phobia affecting the Bf 109 fighter pilots, in particular during the Battle of Britain). As with the early "Intruder" sorties over Britain by *I./NJG 2* in 1940–41, the actual number of kills was fairly small, but the psychological effect on the *Nachtjagd* aircrews was noticeably debilitating according to many postwar accounts rendered by surviving personnel.



The "twin" executioners of RAF Bomber Command's bombers, and more tragically thousands of their crew, were the Ju 88G-1/6 and Bf 110G-4 variants. In this picture an example of the Ju 88G-1 that was powered by the BMW801 radial engines is seen in the company of a Bf110G-4 sitting in the foreground. The advent of *schraege-Musik* weaponry was a principal cause of this upsurge in aerial destruction.

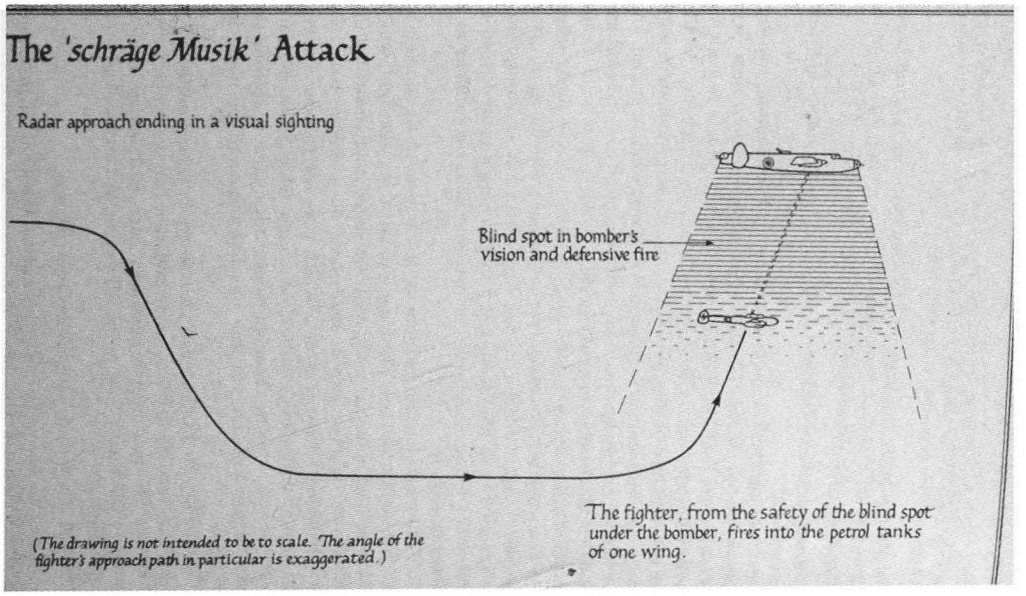


Until mid-1943, the *Nachtjagd* fighters mounted their guns principally in the nose, as did their Allied adversaries. Then, a switch was made to the location of single or twin 20 or 30 mm cannon in the rear cockpit (Bf 110G-4) or forward fuselage behind the cockpit (Ju 88G-1/6). This diagram demonstrates how the guns were angled in a 70-degree manner, which allowed the night fighter to approach from a largely undetected underneath angle, as opposed to the original level or diving manner, which allowed the RAF gunners a better chance of detecting their assailants.

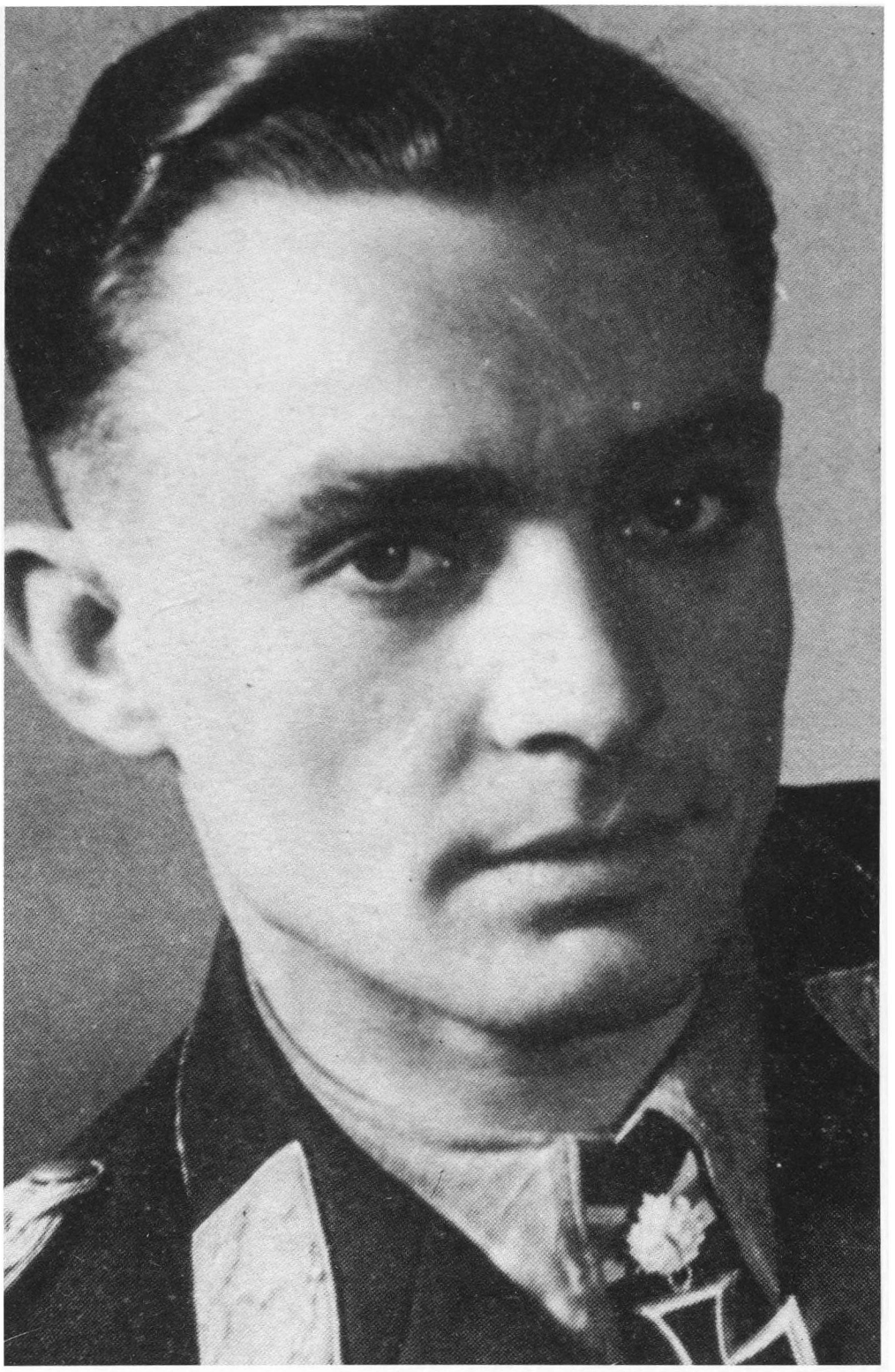


The twin muzzles of the cannon are caught in a closer view of the rear canopy. In this instance the *schräge-Musik* weapons are positioned behind the entrance hatch—a fact that would be to the *Bordfunker*'s advantage but conversely would hinder the *Bordschuetzer* in his bid to gain his position! The rear MG81Z's support frame is outlined within the curved aperture.

Although taken at a relative distance from this Bf 110G-4, the layout of a *schräge-Musik* kit is clearly picked out, as is the *Bordschuetzer*'s MG81Z with its gunsight. It was not unusual for a pilot to position his night fighter in a manner that allowed the rear gunner to focus on and likely bring about the destruction of a bomber.

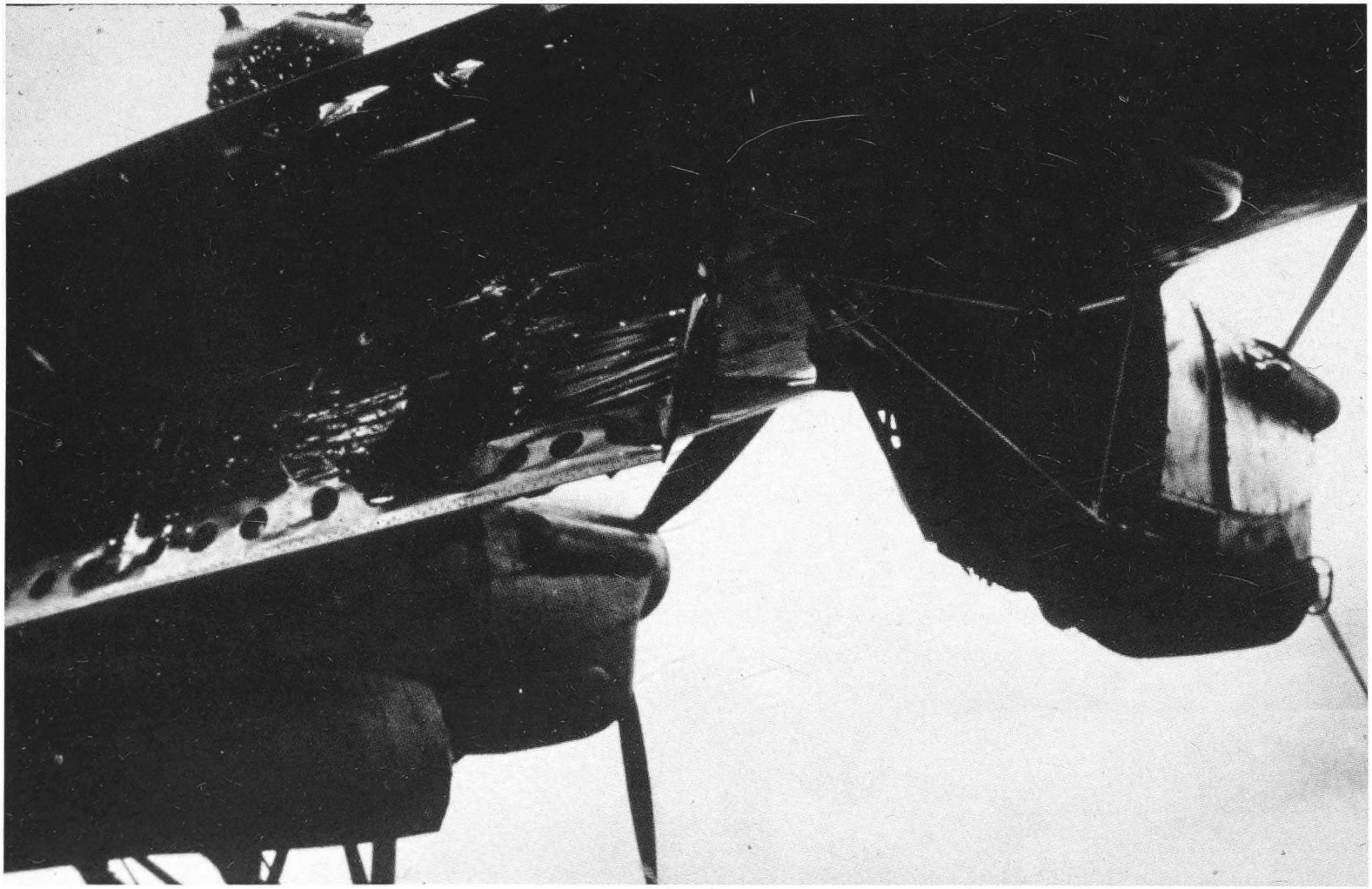


This chart demonstrates the crucial advantage of the *schräge-Musik* approach to a target vis-à-vis the hitherto-standard method. The pilot could pick up a contact, home in on it unobserved, and conversely be reasonably certain that his presence would not be picked out. The absence of the equivalent of the USAAF bombers' ball turret on the RAF heavy bombers tragically enhanced the prospect of unqualified success for the *Nachtjagd* crews.



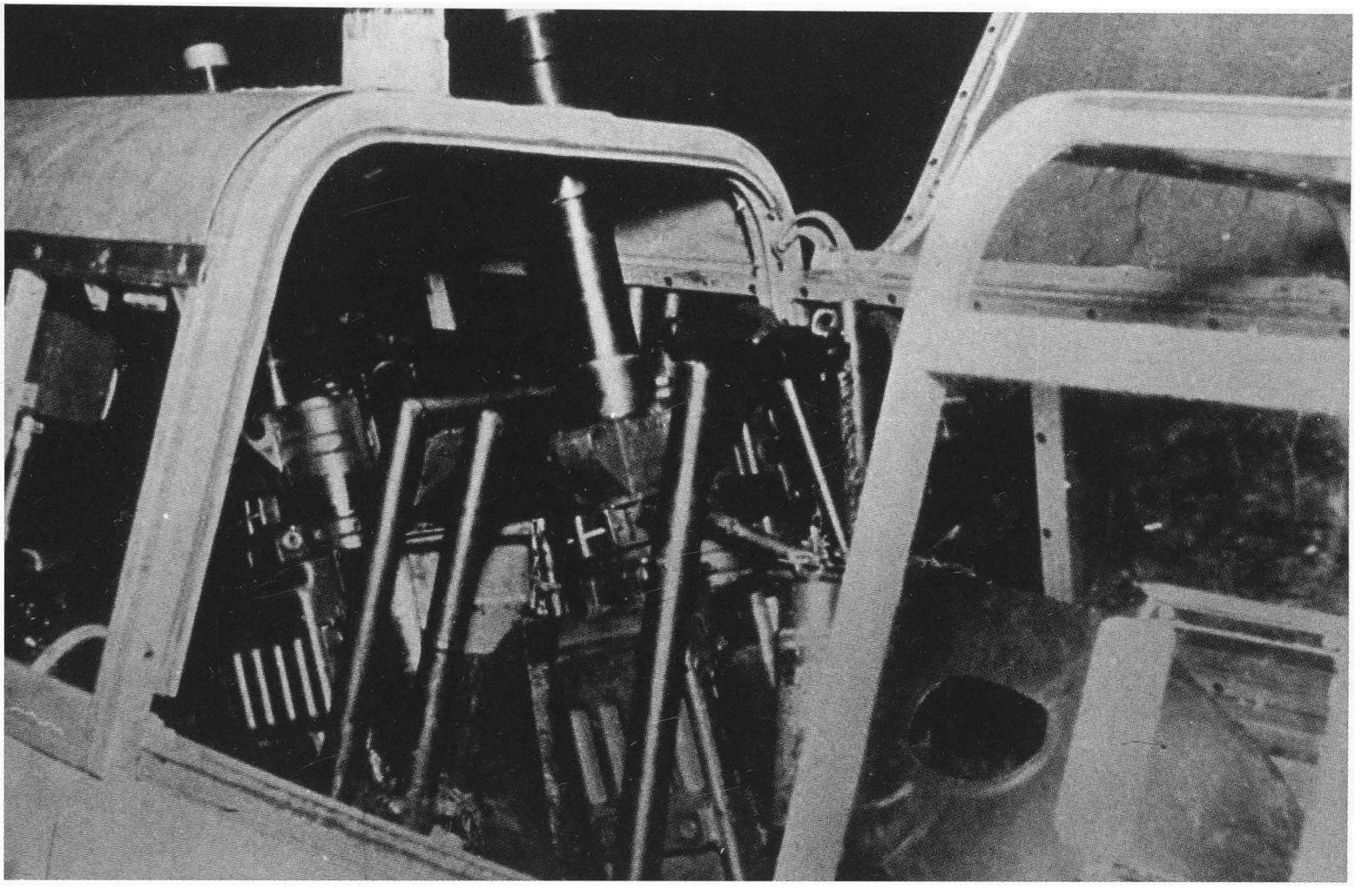
Maj. Paul Zorner was originally a Ju 52 pilot, but during 1941 he transferred to performing *Nachtjagd* duties. Commencing with *8./NJG 2*, he subsequently was *Staffelkapitän* for *2./NJG 2* before being downed by B-17s on April 17, 1943; he survived this as well as a second incident in July. Promoted to the command of *III./NJG 5* the following April, he ended World War II with fifty-nine *Abschuesse*, having been awarded the *Ritterkreuz* (Knight's Cross) with *Eichenlauben* (Oak Leaves).

One of the most successful *Nachtjagd* crews was headed by *Maj.* Heinz-Wolfgang Schnaufer (*center*). He is flanked by *Ltn.* Wilhelm Gaensler (*left*) and *Ltn.* Fritz Rumpelhardt, *Bordschuetzer* and *Bordfunker*, respectively. No fewer than 121 aircraft were culled from Allied ranks by this team. All three survived World War II, but Schnaufer died of his injuries following a traffic accident in France during 1950.



When the author first viewed this picture of a No. 49 Sqdn. Lancaster, with rods indicating the angle of the cannon shell strikes, he was unaware of the existence of the *schräge-Musik* technique. The crew were fortunate that the damage was so minimal and that the fuel tanks remained intact; otherwise the resultant ignition would have almost certainly proved fatal. Such a degree of good fortune was not visited upon hundreds of this crew's contemporaries.

The rear section of the Bf 110 cockpit was utilized for the *schräge-Musik* cannon. The position selected here is directly ahead of the side-hinged frame that allows access for the crew's *Bordfunker* (radar operator) and *Bordschuetzer* (gunner). The bulky nature of the cannon structure must have caused problems for the aforementioned airman, since his location was ahead of the guns.



Oblt. Wilhelm Johnen was an *Experte* flying with *5./NJG 5*, whose Bf 110G-4 was sufficiently damaged during an April 1944 combat with a bomber to compel him into seeking a landing in neutral Switzerland. The picture picks out the centrally positioned *Lichtenstein C1* (FuG212) aerial array that took over from the main SN-2 (FuG220) set when closing to minimum range on a target. The crew were later repatriated and their aircraft was blown up in return for the Luftwaffe's dispatch of twelve Bf 109s to the Swiss air force.

In the case of the Bf 110G-4 there was a further aerodynamic impediment to add to the massive FuG220 *Hirschgeweih* aerials, backed in this case by the presence of the FuG212 nose-mounted aerials. The need to diminish the glare of the DB605-series exhausts resulted in the fitting of equally bulky shrouds, as depicted on an anonymous night fighter's port engine.

The last of the line. The RAF Museum in London currently possesses the sole complete and publicly available Bf 110G-4. The aircraft was captured at Grove in Denmark in 1945 and, following evaluation at Farnborough and various postwar moves around the UK, was installed in the museum's Battle of Britain building in 1978. When photographed here, it lacked the FuG101 radio-altimeter aerials, normally positioned under the port wing. The markings relate to *3./NJG 3*.

Ron Mackay's interest in aviation commenced during World War II. The local Coastal Command airfield at Wick, Scotland, provided a wealth of RAF and USAAF designs to stimulate his enthusiasm; postwar National Service sustained the interest. In addition, a working knowledge of German subsequently extended his field of study to the Luftwaffe, with specific reference to nocturnal operations—a relevant choice since his uncle flew and survived operations with Lancasters of No. 49 Sqdn, RAF Bomber Command. The latter activity led to regular visits to Luftwaffe reunions, with much valuable personal anecdotes and technical information garnered. To date, nearly thirty books, several of them coauthored, have been brought out, while on current hand are contracts for a further number of RAF and Luftwaffe titles.

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The concept of a twin-engine fighter that could accompany bomber formations and effectively drive off defending fighters was the rationale behind the creation of the Messerschmitt Bf 110. Initial operations during 1939–40 seemed to justify its existence, but the generally weak level of aerial opposition bred a false sense of security among the aircrews that was thoroughly blunted during the Battle of Britain. Better fortune attended the *Zerstörer*'s (Destroyer) operational career when utilized in two alternative ways. First, it proved a steady platform for ground-attack duties, given its heavy cannon and machine gun battery. Even more effective was the switch to a night fighter function, where it proved a deadly weapon along with its Ju 88 contemporary in Germany's Home Defense against the nocturnal operations launched by RAF Bomber Command.

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